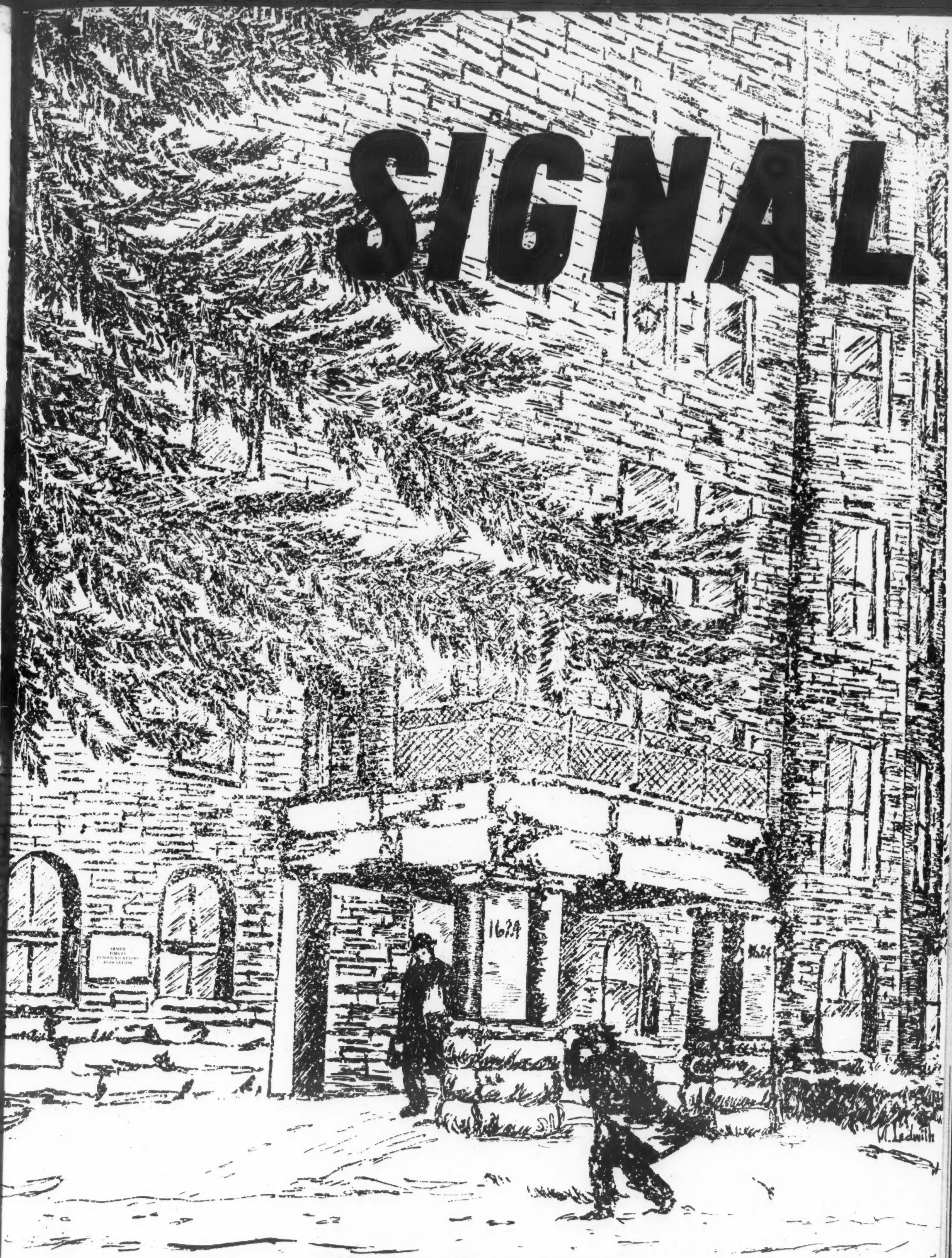
SIGNAL
1624 EYE STREET, N. W.

TODAY

—complete output of the SONOTONE-designed Sintered-Plate Nickel Cadmium storage battery is consigned to the United States Government exclusively.

TOMORROW

— this great new battery — developed and now being produced by SONOTONE—will be made available to American industry for civilian use. Inquiries regarding its availability for defense contracts and eventual commercial use are invited.

the battery the world is waiting to use

BATTERY DIVISION

SONOTONE CORPORATION

Elmsford, New York

Another muscle in America's arm

HERE'S a Western Electric installer. He's connecting more telephone equipment at an aircraft plant so more war planes can speedily be put into our skies. Each telephone added, every new bank of equipment installed, makes America stronger. At Western Electric we're working hard at the urgent job of producing these things. It's our *regular* job because we're the manufacturing unit of the Bell System.... have been for seventy years.

But beyond this, the specialized skills gained in a lifetime of telephone work are now more and more being called on by America's armed forces. For them we are making such electronic marvels as radar fire control systems for anti-aircraft and naval guns, for bombers, for guided missiles.

Western Electric

MANUFACTURING AND SUPPLY UNIT OF THE BELL SYSTEM

SILECTRON C-CORES... BIG or LITTLE

...any quantity and any size

Wound from precision rolled oriented silicon steel strip as thin as .00025"

W&D 4363

For users operating on government schedules, Arnold is now producing C-Cores wound from ¼, ½, 1, 2, 4 and 12-mil Silectron strip. The ultra-thin oriented silicon steel strip is rolled to exacting tolerances in our own plant on precision cold-reducing equipment of the most modern type. Winding of cores, processing of butt joints, etc. are carefully controlled, assuring the lowest possible core losses, and freedom from short-circuiting of the laminations.

We can offer prompt delivery in production quantities—*and size is no object, from a fraction of an ounce to C-Cores of 200 pounds or more.* Rigid standard tests—and special electrical tests where required—give you assurance of the highest quality in all gauges. ● *Your inquiries are invited.*

THE ARNOLD ENGINEERING COMPANY

SUBSIDIARY OF ALLEGHENY LUDLUM STEEL CORPORATION

General Office & Plant: Marengo, Illinois

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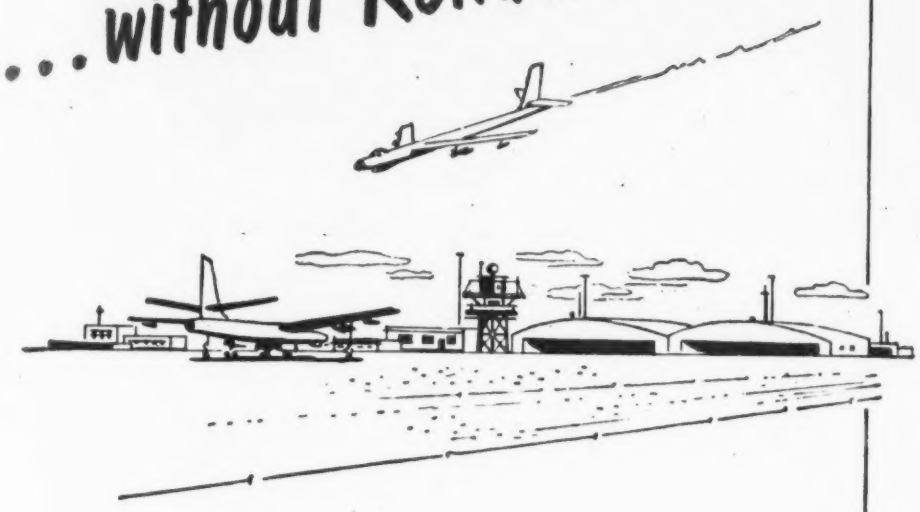
"United Press Photo"

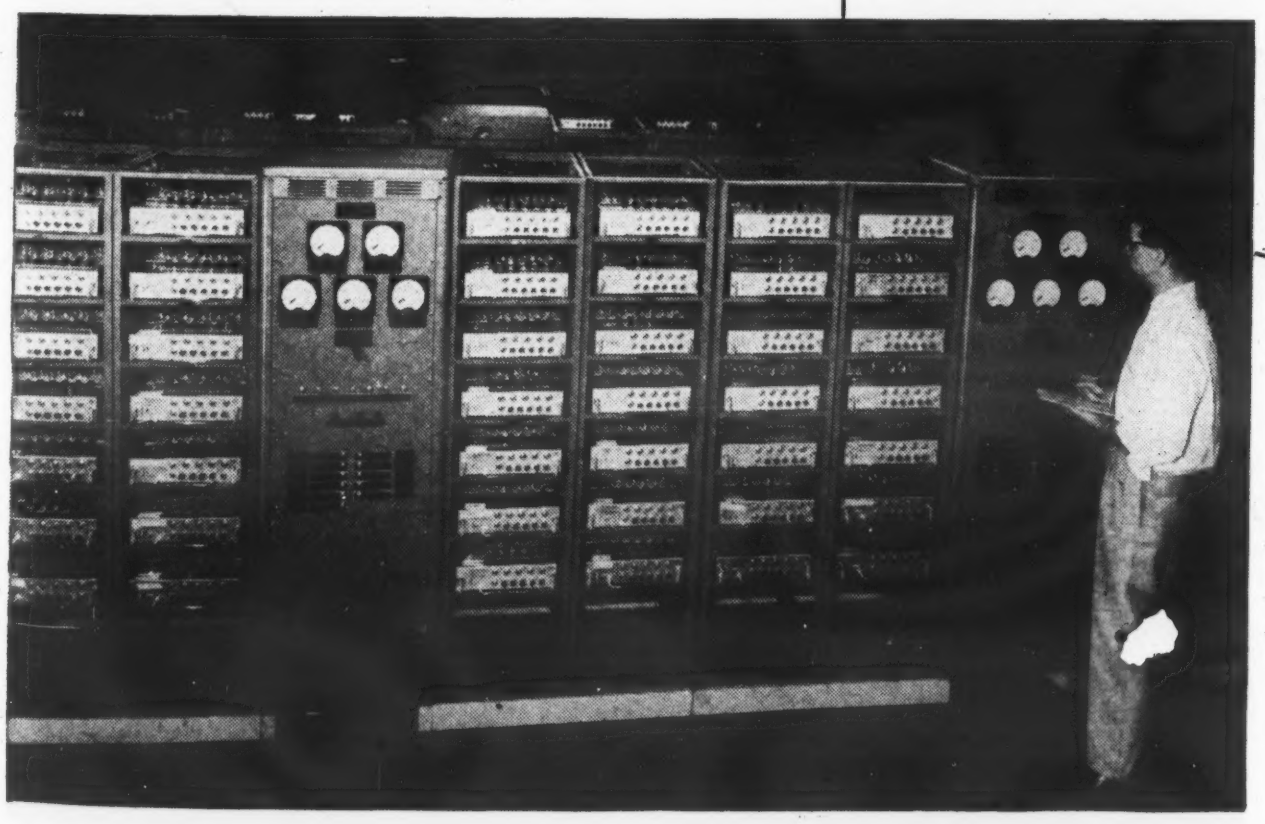
But ...without Reliable Electronics it would have been an Abort!



. . . and Reliability in electronics can result only from excellence in design, manufacture, inspection, and testing methods.

The DuKane Corporation maintains a vacuum tube "proving ground" which provides a constant flow of tubes for the assembly lines of one airborne project at their plant. This "proving ground" constantly ages 10,000 tubes by a process of simultaneous vibration and full power operation before they are subjected to a close-limits inspection. This is only one way DuKane assures greater "Reliability" in electronics.

If your service has a classified project or a prime contractor has a project where electronic "Reliability" is the number one factor, take advantage of DuKane's thirty years of experience and established manufacturing facilities. Let our technical men discuss it with you.



DUKANE
CORPORATION
ESTABLISHED AS "OPERADIO" 1922
ST. CHARLES, ILLINOIS

Changing the map of the world

—with RCA Shoran

A SHIP SANK in these remote straits — because a chart was wrong. But that won't fool navigators any more. Modern aerial survey . . . using RCA Shoran and photography together . . . recorded the *true* shoreline (the lines in white). Now, the charts are right!

Surpassing any optical survey system now in use, this radar "yardstick" can map land-and-water areas never explored by man—and do it at flying speeds as high as 600 mph. Accuracy is better than 50 feet in 100 miles or more. Here's how it's done.

Two widely separated SHORAN stations on the ground (or aboard ship) form the base of a triangle. The plane becomes the apex. Pulsed radar signals from the SHORAN are received by each ground station and retransmitted back to the pilot. On a radar screen the pilot sees one "pip" for each station signal. He calibrates the "pips" and gets his fix. Cameras used with the Shoran equipment simultaneously photograph the calibrations—and the ground along his course. *Result: a highly accurate and permanent record of every square foot he covers.*

Just another application of RCA Shoran—added to its use in locating oil wells, plotting microwave radio relay and pipeline routes, detecting mine fields, and precision bombing.

RCA

RADIO CORPORATION of AMERICA

ENGINEERING PRODUCTS DEPARTMENT CAMDEN, N.J.

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SIGNAL

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THE COVER

This issue of Signal brings Season's Greetings from AFCA National Headquarters, 1624 Eye St. N. W., Washington 6, D. C.

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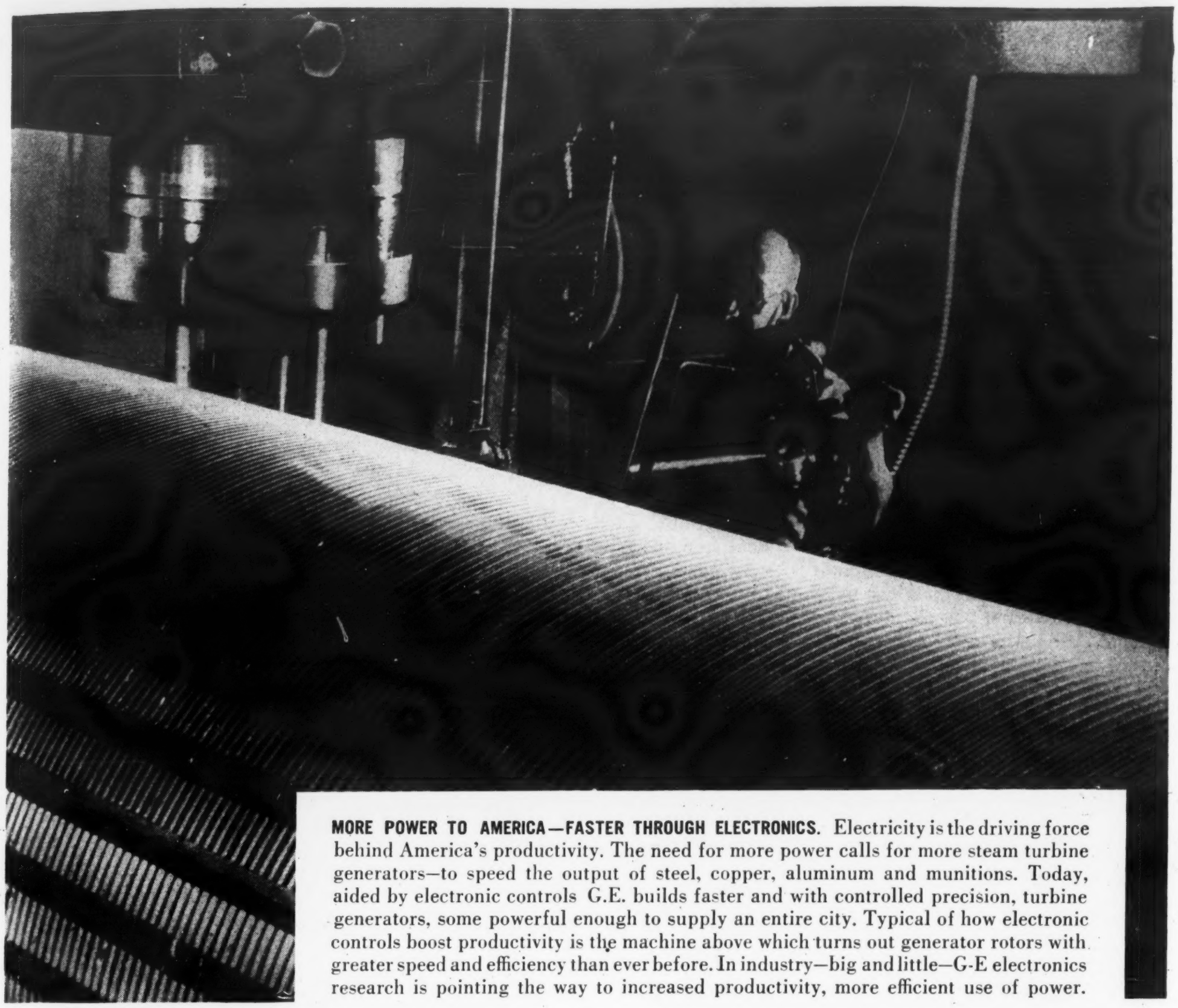
G-E Electronics Research helps protect

THE ability of America, its people and its industry, to produce is your major protection against foreign aggression now and in the years ahead.

America has decided to resist efforts of Iron Curtain countries to dominate the world. We must be prepared to outproduce our real or potential enemies or be overcome. We must maintain production, not only of armament, but also of the goods and materials that sustain our standard of living and keep our economy healthy.

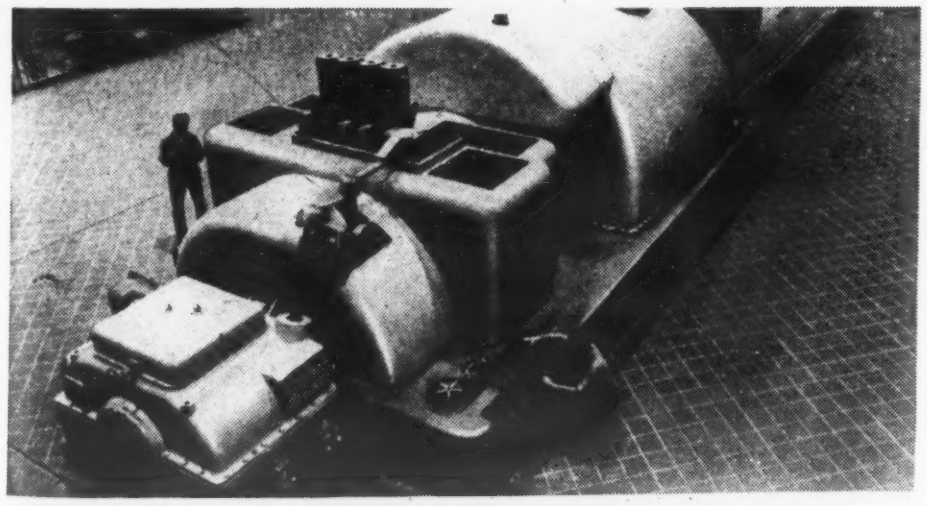
On our side are the advantages of machine power and skill. The new science of electronics offers us a means of expanding these advantages.

G-E research in electronics is blazing the trail in modernizing ways of work to give America a new edge in the Battle of Productivity. By controlling machines . . . taking over the tasks of counting, sorting, measuring and guiding . . . electronics can multiply muscle power and mind power, enable American workers to produce more, with less physical exertion. G-E developments in electronics provide the workingman with better tools, the fighting man with better weapons, offer industry new ways to improve both productivity and quality. The same research experience, engineering and manufacturing skills that made these advances possible enter into the design and production of General Electric television and radio sets for the home. In all phases of electronics, you can look to G.E. for leadership.



MORE POWER TO AMERICA—FASTER THROUGH ELECTRONICS. Electricity is the driving force behind America's productivity. The need for more power calls for more steam turbine generators—to speed the output of steel, copper, aluminum and munitions. Today, aided by electronic controls G.E. builds faster and with controlled precision, turbine generators, some powerful enough to supply an entire city. Typical of how electronic controls boost productivity is the machine above which turns out generator rotors with greater speed and efficiency than ever before. In industry—big and little—G-E electronics research is pointing the way to increased productivity, more efficient use of power.

America's critical edge in the Battle of Productivity



A MODERN TURBINE-GENERATOR. Electric power equal to the muscle power of eight million men, about twice that of all the men in our combined armed forces, is packed inside this streamlined power maker. One of these giants generates enough electricity to produce 880 tons of steel every 3½ hours, or furnish light and power for a modern city.

G-E ELECTRONIC "MATHEMAGICIAN"...answers in seconds problems mathematicians would take 20 years to solve—even has an unfailing memory. Developed by G-E research to simplify research itself, this electronic "brain" speeds by many years the time-table of discovery—so vital to America's increased productivity and to your security.

You can put your confidence in— **GENERAL ELECTRIC**

P.M. is not ...

By: Major Thomas M. Rienzi
Signal Corps

When one sees the term PM, it could mean many things to many people. To the man of distinction it may mean PM Whiskey; to the mortician, Post Mortem; to the cigarette smoker Philip Morris; to the unsuccessful business-man, Poor Management; to the doctor, Preventive Medicine; however, if we are discussing the electrical operation of a successful civilian or military communication system it means only one thing, *Preventive Maintenance.* This term is defined by scientific journals, military publications, and popular magazines, but the most inclusive one I believe is found in an Army Regulation. It reads like this, "Preventive Maintenance is the systematic care, servicing, and inspection of equipment, for the purpose of maintaining it in serviceable condition, and detecting and correcting incipient failures." Excellent and all inclusive, yes, but I believe our great elder statesman, Benjamin Franklin tied it together very neatly when he said, "A Stitch In Time Saves Nine." With this as our philosophy let's for the next few minutes, by the medium of our SIGNAL publication, review the major factors which would cause an unsatisfactory PM situation, a structure of a program which would help our PM situation, and finally how supervisory personnel can quickly recognize good Signal PM, in order to assure the least "Out Time" for our electronics equipment. These ideas were developed by the Signal Group of the Army Field Force Senior Commanders Preventive Maintenance Course which was held at Aberdeen Proving Ground during the spring of this year. Colonel Latta our boss, Lt. Col. Reiser the Ex, Major Pooley of Korea, and I felt so strongly as to the worth of Preventive Maintenance in a communication system, that this short group of helpful hints in the interest of "Getting the message thru," is given to keep the art of Signal PM alive.

If you desire Command Control in your business operation or in your military unit it can only be gotten from a well maintained communication system. Without proper "routining" or Preventive Maintenance and without a good maintenance "follow-up" system your control will be lost. Therefore, let's look into what many believe are the factors which could bring about poor PM as far as electronics are concerned. The first one might well be the fear of being embarrassed, the mystery, or the awe which seems to surround electronic equipment in this day and age. Many junior and senior officers fail to inspect communication equipment because of the supposed mystery which they believe inherent in this gear. I know that we can show you that there is no mystery in this equipment if we learn a few easy to remember simple things to look for in electronics. In a later paragraph we will talk about recognition of good PM. Therefore, let's say the first factor to overcome is that we must *debunk the mystery* surrounding electron tubes and their equipment.

Next in our opinion *time must be provided* to assure that your equipment is "routined." Often, in your programs, specific time is not provided, or if provided, done only when it is the least desirable for the inspector — say just before quitting time, when there is a rush to get out the gate or at a time when work schedules have been so strenuous that the "will" to maintain is lost. A must for communication equipment is this *habitual* and *systematic* inspection.

Repair parts must be known and on hand. Two members of the supply section look through stock parts for all radios in the 2nd Infantry Division area and record them on stock cards.

...poor management

Preventive Maintenance saves time, money and lives

detection, and correction of incipient failures. Thus, the second factor to consider is that *time must be provided* during the work day or after the work day to assure Signal PM.

The next reason for a poor status in your system has to do with these three shortages, *skilled personnel shortage, technical literature shortage,* and *repair parts shortage.* As we all know there will always be a lack of technicians to operate our civilian or military system. This then means that we must use our people to the fullest extent, assure that our personnel managers are active in allocation of these hard to get people, and then activate and run "on-the-job" training schools to attempt to keep a backlog of semi-skilled men in the system when our highly technical people are lost.

Now, we all know that with each piece of equipment we must have the operational instructions to assure proper maintenance. Without the "book" our equipment will go to ruin because of the usual improper practices. Back operational procedures up by the book, and then you will have no trouble.

Finally, repair parts, which experience has shown must be near at hand, must be readily available to the operator and inspector. Without the replacement parts of the equipment you know the "Out Time" will be greater and the loss of revenue or loss of valuable command instructions will ensue.

Next with any equipment in use today, it is known that *design production bugs* will be found in the material. Assured that this will happen, a system must be set up to report design or production failures on what we will call Unsatisfactory Equipment Reports. This reporting certainly should be made to the manufacturer or designer in order that he can put your ideas into his later models, thereby improving the overall system.

The last factor has to do with the weather. I believe Mark Twain once said, "Everybody talks about the weather but no one ever does anything about it." This was in general a truism until about the time of WW II. Communication equipment designers decided to produce a lacquer to prevent harm to the equipment from moisture, fungus, and corrosion thereby licking some of the weather problems. This is known as *Moisture Fungi-Proofing.* In the military the term is M.F.P. which is stamped on all equipment with a date as to the time of completion. If your control is such that proper temperature and humidity can not be attained then MFP must be accomplished.

These then, are the seven major factors that we in the Signal Section believe will cause a poor status in your system.

Next, let's discuss the structure of a program which at least in the military has been found to work, in assuring good Signal PM. The first tool in use today is the daily, weekly, and monthly check list. Experience of many years has helped design "routining" check lists, which must be honestly completed by all the people in your system. These forms are then checked and proper "follow-up" made by your supervisory personnel. By these daily, weekly and monthly sheets, habitually and systematically completed by sincere people, a close check and control will always be available on your system. Breakdown will be reduced to a minimum if the lists are initially designed to completely check the ma-

Members of the 65th RCT, 3rd Infantry Division, call to headquarters to receive final instructions, as elements of the 3rd Infantry Division move up during the offensive drive launched against the Chinese Communist forces in that area.

This repairman can take your initial PM Indicators and keep the equipment working, if only he knew of them in time by your inspections.

terial about once each month. In addition, a system of technical inspectors must be recruited who will completely check all your equipment at least twice a year to assure serviceability of the material and effectiveness of all your maintenance activities. These teams will be composed of highly skilled men of many years experience in the industry. They will be the second link in your structure to assure good PM. Now, behind this inspectorate whose findings can only be implemented by your managerial action, we must build a third block of technical representatives. These men usually should come from the depots or manufacturers of your gear. They should be provided approximately every three months to each of your operational stations. They will advise and in a friendly way help your personnel to gain a complete and full knowledge of the equipment. Usually they should have 20 or 30 years experience with electronic people and the equipment on which they are advising. The military might call them Maintenance Advisory Teams. The civilian industry usually calls them Technical Representatives. Again with this third pillar in our system, command or managerial "follow-up" is the action required, to make these advisors useful.

Well, we have mentioned the major factors which will cause poor PM, and a structure of a program to assure good PM. Let's now discuss how the average foreman in a civilian or military system can recognize good PM without too much technical know-how. If we use our common sense, or I should say our common senses of feeling, hearing, smelling, and seeing coupled with the three phenomena of moisture, dirt, and corrosion, we will be on the right road to complete and detailed inspection of our equipment. As we know, moisture, dirt and corrosion do not go hand in hand with any electronic gear. If any of your senses detect any of them, it should be a *Pm Indicator* to you that soon your system will be inoperative. Therefore, in our daily rounds of equipment or at our habitual inspections look for the three by all of our senses. An example might be the inspection of a telephone. In looking at this item the following questions might pass through your mind.

Is the handset cracked or dirty?

Does the set feel wet?

Do you smell the damp odor of mildew?

Is the insulation wet and dirty?

Is the battery compartment dirty or corroded?

Are connections loose, dirty, or wet?

Are there signs of rust?

The Author

Until recently, Major Rienzi was a Staff Instructor at the Army Field Forces Senior Commanders Preventive Maintenance Course. A graduate of the U. S. Military Academy, he holds degrees in mechanical engineering and communication engineering. Another article, DUCK, THEN UP AND AT OM, by Major Rienzi appeared in the January-February '52 SIGNAL. At the present time, he is General Staff Officer, Department of the Army, in Washington.

Well, in our example, if the answers to any of these questions in your mind is *yes*, then these simple *Pm Indicators*, say that this part of your system soon will be inoperative.

Now in conclusion we hope we have given you some of the factors which could cause poor maintenance. a structure of a program to help assure good communication, and finally a way to easily recognize good maintenance. However, PM, not poor management, is fundamentally a problem of attitudes at all levels, and consequently there must be command action to energize your Signal PM program. *Therefore, the Key to PM is Command Action. If You the Commander or Manager are Aggressively to have Preventive Maintenance You'll have it,* by using these helpful hints from the Army Field Force Commanders Preventive Maintenance Course.

Power units in a stock yard of the 65th Signal Depot for salvage, repair and overhaul. Check lists are being used here in Korea.

Admiral

Ashore–Afloat–Aloft

Admiral in Peace

The story of Admiral Corporation is a saga of Americana at its Horatio Alger best.

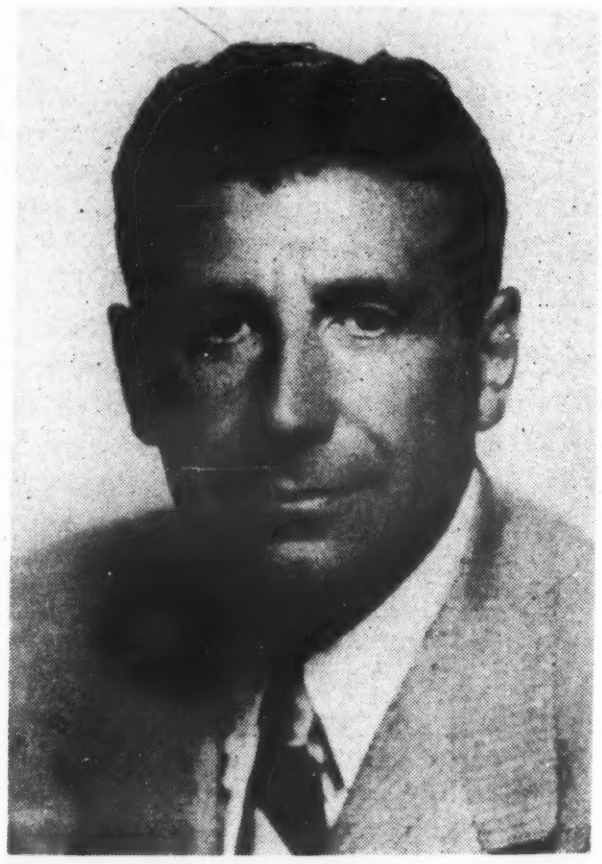
1. From a working capital of $3,000 in 1934 to $30,000,000 in 1952 and a net worth of close to $45,000,000.

2. From a rented garage space of 5,000 feet in 1934, Admiral today owns 10 plants, plus numerous leased properties which total over 2,500,000 sq. feet with a productive capacity of close to 500 million dollars per year. Production lines of ⅛ of a mile in length produced almost 6,000 TV sets per day.

3. From a sales volume of less than $250,000 in 1934 to $200,000,000 per year in 1952.

4. From a small table model radio in 1934 to Radio, Television, Automatic Phonographs, Refrigerators, Freezers, Air Conditioners, Electric Ranges, Custom Plastic Cabinets, Wood Cabinets, and last, but far from least, the most highly complex type of military electronic equipment in 1952.

MR. INSIDE
Executive vice president John B. Huarisa



5. From 57th and last place in 1934 to acknowledged leadership in a most competitive industry in 1952.

6. From a few scattered purveyors of private label radios in '34 to over 30,000 dealers and 80 distributors in America plus distributor and dealer representation in 30 foreign countries in 1952.

7. From half a dozen employees in 1934 to over 8000 people in 1952.

8. From one small engineering department of three people in 1934 to six laboratories with over 500 people in 1952, plus large production engineering and field engineering staffs.

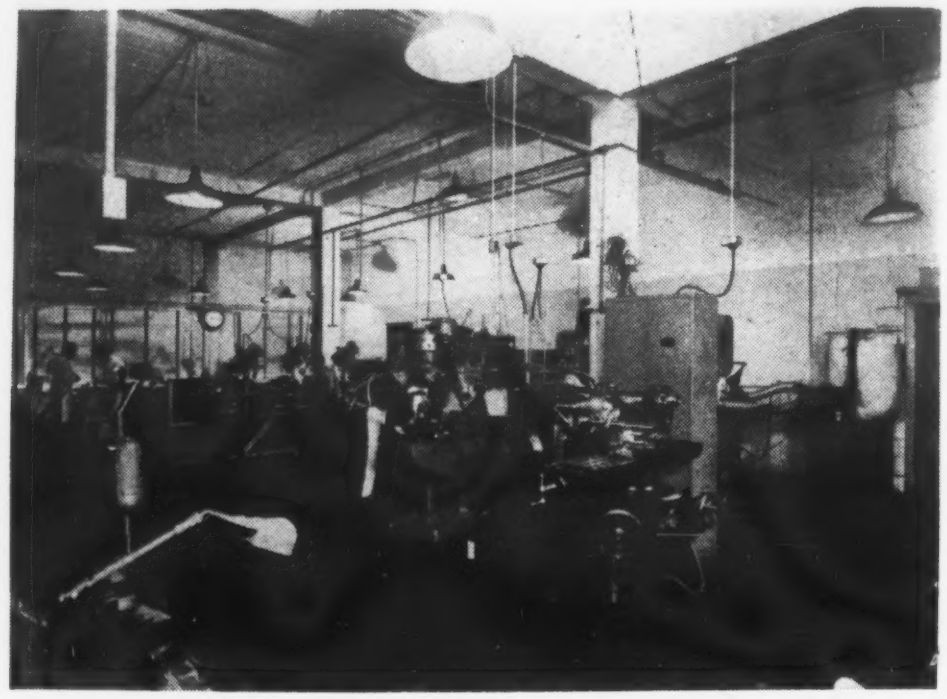
These Golden Milestones mark the path of success which was achieved in the land of competitive opportunity, America. Today, glowingly healthy, soundly wealthy, broadly experienced, aggressively ambitious, Admiral Corporation occupies a position in industry which opens broad vistas of the years ahead. It is in a position to shoulder arms and fight its country's enemies with the greatest mass production electronic lines in the world, or it is in a position to wage the unceasing war of peace with more and better products for less money.

The two men who have nurtured this sturdy child are its President and Board Chairman, Ross D. Siragusa and its Executive Vice President, John B. Huarisa. Both in their early forties, they have formed the ideal business partnership, with Siragusa developing the sales and merchandising policies, supervising the financial and administrative end of the business, and with Huarisa developing the mass production techniques, the engineering ideas and constantly seeking ways to make products better, faster and for less money. They form a perfect foil for each other. You recall the Great Army Football Team with Blanchard and Davis in the backfield as Mr. Outside and Mr. Inside. Admiral has this combination in Siragusa and Huarisa. If Siragusa sells it Huarisa just has to "make it or bust" and if Huarisa makes it, Siragusa just has to "sell it or else!" This thriving internal competition has provided the American people with fine merchandise it can afford and, at the same time, it has provided its military leaders with a highly efficient industrial machine to produce its needs speedily and at reasonable prices.

MR. OUTSIDE
Chairman of the Board and President
Ross D. Siragusa

Originally known as Continental Radio and Television Corporation and with a major portion of its production built under private labels, the name ADMIRAL appeared on very few radio sets and was sold through a few small distributors prior to 1939. In 1939 began a series of industry shocking explosions which are continuing to this day. The first was a radio phonograph table model retailing at $50 when the average competitive make was selling for $100. The next was an engineering scoop of a miniature portable AC-DC and battery radio. Interrupted by the war for a few years, Admiral again resumed its march to leadership with the innovation of the world's largest

Corner section of governmental testing laboratory at Admiral's Chicago plant.



Section of experimental model shop and governmental engineering laboratory.

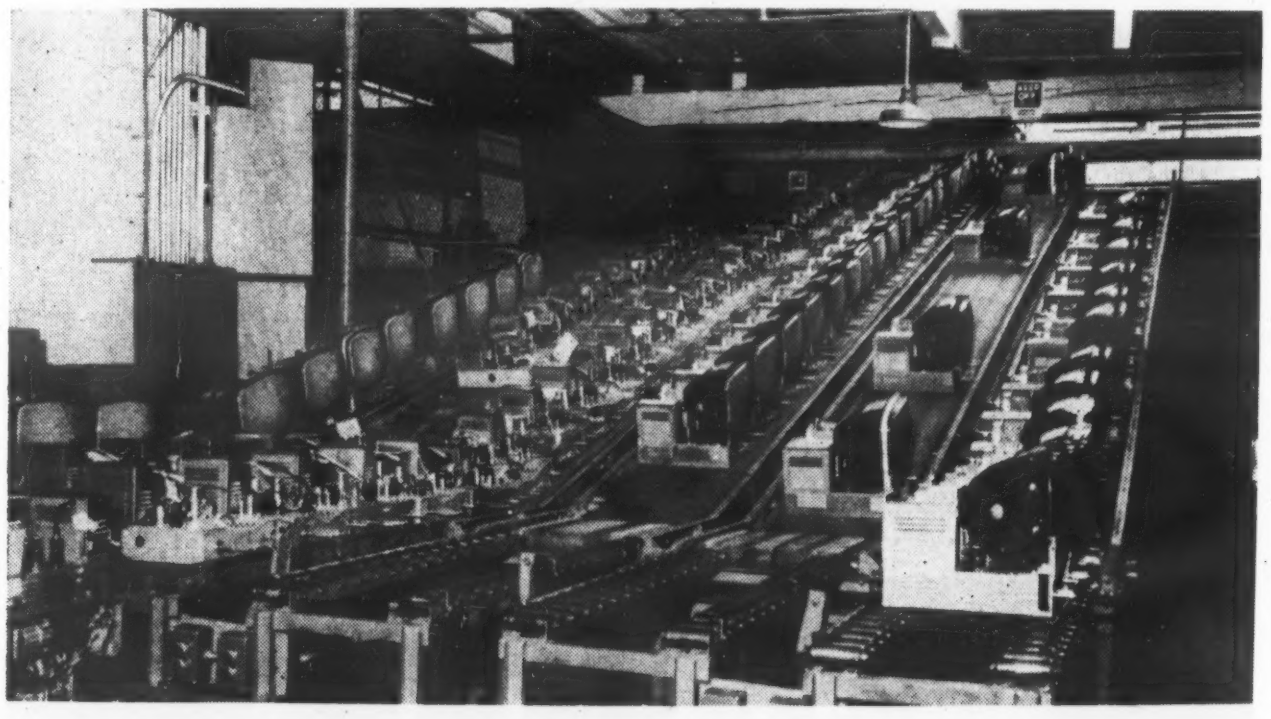
one-piece plastic table model radio phonograph combination at prices substantially below competition. Again and again Admiral's ingenuity contrived a conspicuous *First* in one form or another to build greater public acceptance and demand. Probably its greatest achievement in gaining recognition was its 1947 assault upon the towering price structure of the fabulous infant *Television* — introducing beautiful and revolutionary styled cabinetry known as "Television Optional." It created a sensation with prices from $50 to $250 below comparable merchandise. This springboard catapulted Admiral into a position of dominance which it retains today in the TV field. It had long held the title of world's largest maker of radio phonographs with automatic record changers, and had introduced the first three-speed, all size, record changers.

In 1943 the Continental Radio and Television Corporation changed its name to Admiral Corporation and began laying plans to enter the Refrigerator and Appliance fields through the purchase of the Stewart-Warner Company Appliance Division. This was accomplished in 1944. With characteristic aggressive approach to a problem, they began by absorbing not only the refrigeration engineering department of Stewart-Warner but its service department as well, thus acquiring the years of actual experience, the trials and errors of the past. Admiral took what was admittedly the finest refrigerator on the market with its exclusive *No Defrosting* principle and, with the aid of the foremost stylists and designers in the industry, created a refrigerator which not only was proclaimed the Industry's most beautiful but incorporated several patented innovations. This of course was done by the post-war planning group and was ready when materials and tools were available after the war. That Admiral designed the refrigerator of tomorrow is attested to by the fact that three of the leading refrigerator manufacturers are today marketing the same type of food preservers.

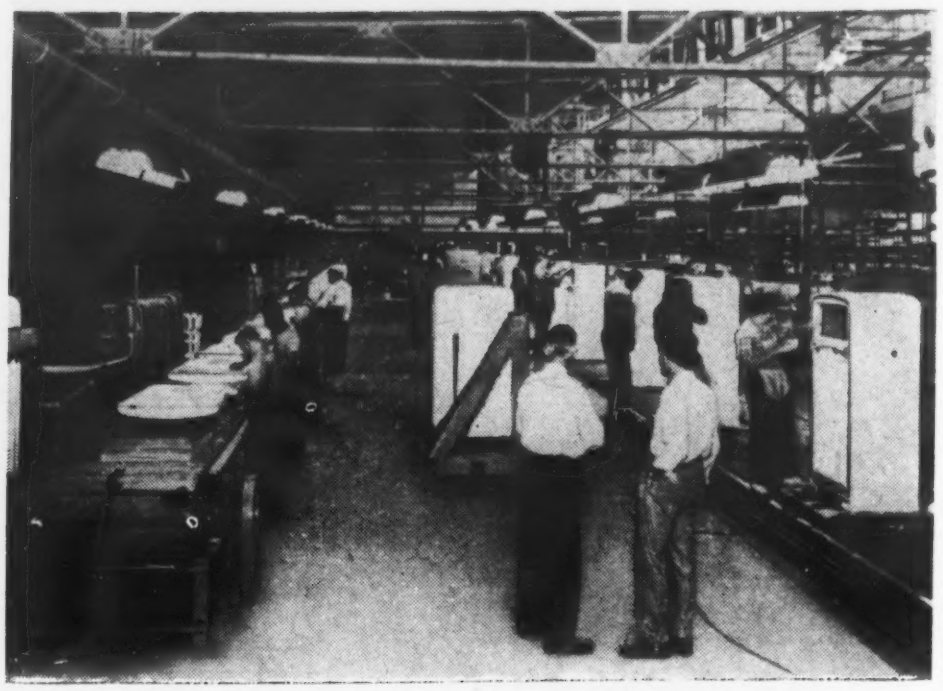
The story of Electric Ranges parallels that of the refrigerator—again the drive to achieve matchless beauty with sound quality at fair prices met with success and the post-war design of Admiral's electric range has set the pattern for the leaders in the electric range field today. The original Admiral refrigerators and ranges were built to Admiral specifications, under Admiral supervision by other manufacturers. Today the new Admiral plant of approximately half a million sq. feet in Galesburg, Illinois, has a capacity of 1500 refrigerators per day, is equipped with the most modern mass production machinery and is a marvel of efficiency. It has the latest scientific equipment in its laboratory and a large well seasoned engineering department as well as test kitchen under the direction of one of the greatest home economists in the industry. Now known as the Midwest Manufacturing Corporation Division of Admiral, it offers twice its wartime capacity when its job was the production of droppable fuel tanks, mine and cartridge cases, life raft floats and miscellaneous metal parts running into the millions.

Having pioneered in the development of large plastic cabinets for radio phonographs and TV sets, and having startled the industry with innovations in this field, it was natural for Admiral to get solidly into that business. In 1951, the Molded Products Corporation of Chicago, closely related to Admiral in its efforts to originate new *Firsts* became a wholly owned subsidiary. Admiral thus acquired the largest plastic presses in the world, almost 17,000 tons per cycle, using raw materials at a rate of 15,000,000 lbs. annually. This

This bank of television chasis will shortly be beautifully finished Admiral TV sets.



A press line in the Molded Products Corporation.



Door and cabinet assembly line of the refrigeration plant in Galesburg, Illinois.

plant of about 100,00 sq. feet with its own complete engineering, tool and die making, finishing and painting departments, is a valuable asset to Admiral and the Armed Services. It is now developing techniques to mold thermoplastics which will make possible the production of pieces several times larger and heavier than anything heretofore achieved, a field offering great potentialities. Its job during World War II was the production of Frangible bullets, helmet liners, mess trays, headset, binocular, coil cover and cases assemblies, about 30 million pieces were produced and the press capacity has since increased almost 300%.

Producing radio, etc., in Canada for the past 5 years, Canadian Admiral Corporation, Ltd., has grown considerably. Its new expanded plant of some 50,000 sq. feet in Port Credit, Ontario, and its three subsidiary distributing outlets plus independent distributors and dealers, blanket the country. Its sales volume and new worth in spite of very high taxes and consumer credit restrictions, has increased substantially. The opening of new TV stations in Canada will bring nearly a million Canadian homes within range of the telecasts, an increase of 300% over the present market which is largely in the fringe areas of U. S. stations.

Canadian Admiral with its own engineering department augmented by the aid and cooperation of its U. S. laboratories and facilities is not only a potentially great commercial asset to Canada but a valuable ally in war production or mobilization.

Admiral, commercially, is not influenced by altruism but by the mathematical fact that since there are more poor than rich people, and since they want the greatest benefits and conveniences that can be afforded, they represent the huge market of the present and the future. This fact, well-known by Siragusa and Huarisa, is the beacon which guides them and the spur which urges them on. It is a fair guess that with Admiral owned and/or controlled sales facilities in most of the largest cities in the U.S., covering approximately 30% of the population in its greatest marketing areas and with 80 top flight distributors covering the balance, a reasonable share of the American market can be expected to be interested in Admiral products. To insure itself that the potential customer hears about its products, Admiral spends millions of dollars yearly. 1952 is estimated at over $16,000,000. The leading magazines and newspapers, thousands of billboards, national chain hookups of both radio and television stations carry the message of "America's Best Buy." Giant spectacular electric signs in New York's Times Square, Chicago's Loop, Miami's Beachfront, Los Angeles, San Francisco, Boston and other leading cities emblazon the skies with the Admiral Story. Window and floor displays of the country's largest department and furniture stores and the leading radio appliance dealers, feature Admiral's values. Many awards and commendations have been received by Admiral from advertising committees and institutes for its manner and methods of "telling the world." Some of TV's best shows of today were originated by Admiral. It has sponsored such programs of public interest as the Political Conventions, the National Election Returns, the All Star Football Games, the Golden Gloves Boxing Championships, popular boxing matches, Show of Shows, Stop the Music, Lights Out, Broadway Revue, Bishop Fulton J. Sheen and numerous others.

In turn it is rewarded by volume sales; indeed, it is estimated that one out of every eight TV sets in use today is an Admiral. and that its three way combination package value of radio, three speed record changer,

(*Continued on page 74 col. 1*)

Sectional photograph of Color TV signal generating equipment laboratory.

HEADQUARTERS JAPAN

AIR DEFENSE FORCE

Drawings by G. Adacni, JADF Staff Artist

DISASTER!. . .That's his call to duty. It transforms the military amateur radio operator into a professional overnight.

Today he's a student experimenting with communications problems, studying the engineering make-up of modern radio equipment, learning to send his words through a maze of obstructions. But let an earthquake play havoc with landlines, let primary communications fail, let enemy invaders pull a surprise attack to silence Japan, and today's student becomes the boy at the dike on whom rests a large measure of a nation's security. His could possibly be the only voice to spread the news of approaching aircraft, to alert friendly fighters into action, to carry a commander's message to Japan's island-wide air defenders.

Knowing this, the Japan Air Defense Force augments its communications system with a network of military amateur radio stations ready to act in any unforseen emergency, JADF, the command charged with the serious resonsibility of protecting Japan from air attack, is simply not taking any chances on suffering a laryngitis which could cripple the defense mission. Their reserve team. the Air Force "men from MARS," is kept "radio ready" by constant practice and an occasional acid test.

Such a test challenged MARS proficiency during July's mock air raids over Japan. During the drills, which saw JADF's friendly bombers simulate raids on Japanese cities and Air Force installations to test the island-wide air defense system, primary communications were purposely sabotaged or put out of action to see how

effectively emergency type equipment could be utilized.

"The question we wanted answered was how well communications could be handled under the most adverse conditions," Lt. Col. Joseph E. Long, JADF Deputy for Communications and Electronics said.

The exact effectiveness of MARS operations cannot be released for security reasons but it can be stated that throughout JADF, MARS played a big part in the communications show and played that part well.

"Many MARS operators had to work by flashlight during the raids since operating conditions were purposely made unfavorable," Warrant Officer Neal I. Zollars, JADF MARS director said. "But MARS operators proved that it takes more than so-called 'complications' to keep them quiet. They didn't become harassed but got the word through in a cool, efficient manner."

Zollars, when he isn't busy with office work at defense headquarters, spends a good deal of his duty and off-duty time at the Nagoya Air Base MARS station. Like other Marsians in Japan, Zollars is constantly testing radio reception with other stations throughout the world. By knowing how quickly and clearly he can reach another station, Zollars can re-route a message should direct contact prove impossible at any given time.

It's "s.o.p." with MARS stations in Japan that operators test daily the effectiveness and clarity of island-wide communications. Each morning all MARS stations in the Far East tune in on the same frequency and exchange messages. Normally one station calls the roll to make certain lines are clear for emergency traffic. This procedure also takes place at a designated time in the afternoon. An interesting feature of this MARS confab is the abbreviated slang used. The following is typical:

OPERATOR A: Able Item One Able Dog. This is Able Item Five Able Able. Over

OPERATOR B: Able Item Five Able Able. This is Able Item One Able Dog. Over

OPERATOR A: Q-T-C One (I have a message)

OPERATOR B: Q-R-X (wait a minute) Q-R-V. (Ready to copy)

OPERATOR A: Dear Mrs.—a married lady—Jones (Dear Mrs. Jones) How are my X-Y-L and harmonics? (How are my wife and children) Xray initial (period) Seventy-three to everyone xray-initial. (Best regards to everyone) Eighty-eight George. (Love and kisses. George)

Hundreds of messages like the above are handled daily by MARS stations throughout Japan to better airman morale and at the same time keep MARS operators proficient in their jobs. Contact with the states is sometimes achieved in less than three minutes but, recently at least, this has not been the case. Warrant Officer Zollars reports with obvious amusement what happened last time he attempted to radio a message stateside to his wife.

"I kept trying to get the States but all I could pick up was South Africa," Zollars recalled. "Finally I just quit trying and spent the evening learning something about life in the African jungles."

"But these poor periods of reception work in cycles so there's no reason to feel that a message sent stateside won't reach its destination," Zollars said. "Our batting average is pretty good on that account."

The JADF MARS chief explained that atmospheric conditions are responsible for good or poor reception, but rarely pose insurmountable barriers to getting a message through. Once a message leaves a MARS station it is relayed stateside to the "ham" operator nearest the address. The ham then mails or phones in the message to its destination.

One thing noticeable about the Nagoya MARS station and others in JADF is the high morale of the one or two airmen assigned to the station on full time duty. Like their namesakes, MARS operators have "big heads" about their work and rightly so. Airman Second Class Paul D. Ferguson, Nagoya MARS operator, sums up MARS attitude in the following way:

"MARS work is fun and excellent training in radio communications," Airman Ferguson said. "I feel MARS offers a real service to airmen in handling stateside messages as well as official Air Force traffic. And you can bet your life that should disaster eliminate primary outlets, MARS won't be silenced."

"We're just too fond of talking."

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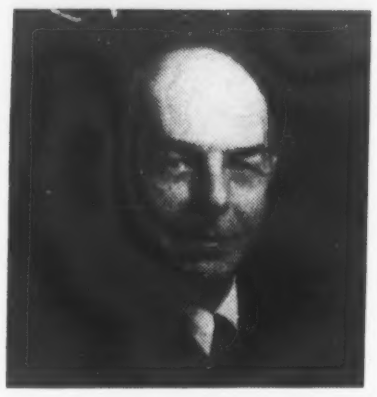
MARS amateurs turn professional over night when the "chips are down." Handling bundles of stateside traffic keeps JADF MARS operators "radio ready" for crucial tests like that posed by July's Japan-wide air defense drills.

During July's nation-wide air defense exercises, MARS operators were constantly harassed by unfavorable working conditions purposely planned to test MARS effectiveness. Many had to work by flashlight during the drills, but the flow of official messages alerting JADF fighters into action continued without delay.

W/O Neal Zollars, JADF-MARS Director will tell you that beaming a message stateside is not always a three minute affair. In attempting to contact his wife, the MARS chief found himself beamed in on South Africa, and had to re-route his message to achieve proper contact.

MARS operators have "big heads" about their jobs and rightly so. In addition to their importance as "wheels" in JADF's emergency communications lifeline MARS provides a real moral booster to airmen by handling stateside messsages.



Chairman Richards W. Cotton explains

THE ELECTRONICS PRODUCTION BOARD

Growth of electronics has generally followed the "Topsy" formula—a vigorous and healthy growth, but in some ways a haphazard and erratic one.

Without stability and direction in times of national emergency, we are likely to have an overabundance of facilities for certain electronics production, and a great deficit of other facilities.

In addition to stability and direction, another need arises which is just as important—a well-coordinated Governmental electronics procurement program which itself is not haphazard and erratic, and which is closely related to the realities of production. This calls for a high-level planning and coordinating group. Such a group—although badly needed—was never established during World War II.

Fortunately, DPA's first Administrator, William H. Harrison, was well acquainted with this World War II situation (he had been associcate Director of the Army-Navy Electronics Production Agency), and this, coupled with his background in the electronics industry as president of International Telephone and Telegraph, led him to give more attention to electronics than might otherwise have been the case.

It should be pointed out before going further that electronics, by Government definition, is a rather all-inclusive term. The National Production Authority considers electronics, quite properly, as gadgets having vacuum tubes in them. But the military definition gathers up everything that transmits intelligence or has wires in it—telephone, teletype, telegraph, wire, cable, power supply, and everything else found in the signal catalog.

To coordinate and plan the procurement and production of these many diverse types, DPA Administrator Harrison established the Electronics Production Board—one of his first acts as head of the newly established DPA.

Although the need for such a body was undeniably present throughout World War II, a number of factors combined to make the need even greater under the present defense mobilization program.

In the first place, there is a much greater division of responsibility for electronics procurement and production within the Government. A dozen or more agencies are involved—seven military procurement agencies, compared with two during the war, and four materials allocating divisions within NPA. Although all military production activities are coordinated through the Munitions Board's Electronic Production Resources Agency, and those of the NPA allocating divisions through DPA, there nevertheless is a large area for conflict and a greater need for firm direction.

A second reason for the greater present need is that more and more we are building our military equipment around the nerve center of electronics. Hardly a single major military item now produced does not carry some form of electronic equipment; every major type carries more electronic equipment than did its World War II counterpart. The K-I bombsight in our B-36—basically an electronic device—costs about $250,000, compared with the $8,000 Norden Bombsight. This same B-36 carries well over 2,000 vacuum tubes, while the F-86 Sabre Jet carries almost 500—more than double the number in wartime bombers and fighters. Then, too, consider the vast new demand for electronics arising from our guided missile and atomic energy program.

Electronic procurement has become coequal in importance to the procurement of the major military end-items.

A third reason, and perhaps the most important of all, results from the very nature of our present partial-mobilization program. During the last war our first concern was to meet the urgent demands of the moment. Costs and other factors were relatively less important. Also, what we required in the way of electronics manufacturing

facilities was fairly well established at an early date. The course was well-defined, and broad policy considerations were necessary only at infrequent intervals.

But under partial-mobilization the situation, though less urgent, is far less well-defined. We are afforded a number of alternatives, each presenting compelling advantages and disadvantages, each demanding detailed study. To what extent should we expand the industry to meet the needs of partial mobilization? What segments of the industry need special attention? What additional capacity will be required to fight a major war? What will happen to the industry when the present program abates? What will keep certain manufacturers of very critical items in production when defense expenditures slacken?

All these questions must be brought to a central point in Government if they are to receive adequate attention. Just how far can the Electronics Production Board go in working out the solutions and putting these solutions into operation?

When I left Philco last June to become chairman of the EPB (actually the chairmanship of EPB automatically follows appointment as Assistant Deputy Administrator of DPA and Director of NPA's Electronics Division,) I wasn't quite certain as to the legitimate areas of inquiry and responsibility of the Board. I asked the legal staff to give me the answer.

Here, briefly, are a few of the more important points contained in the reply:

"The Electronics Production Board is in general a coordinating group charged with the formation and recommendation of policies and procedures under which the Electronics Production Program is carried out. Its area of activity includes the determination of production and requirements covering all production financed and contracted for by the United States."

The legal statement went on to say that, *"The Board formulates and recommends policies and procedures for insuring required production, including procurement policies, the scheduling of components, the expansion of facilies, conservation of materials, standardization of products, provisions for materials, and related matters."*

The key word in this outline is "recommend." The Board does not implement any programs, or issue any orders to manufacturers, or alter the structure of any of the agencies it works through. The various agencies may accept or reject the Board's recommendations.

Membership of the Board consists of an Assistant Deputy Administrator of DPA as Chairman, and representatives of the Secretary of Defense, the Munitions Board, the Army, Navy, Air Force, NPA, and the Atomic Energy Commission. From the membership special committees are formed to look into specific problems.

The Board has undergone two operational phases—it's now in its third—since it was set up in March of 1951.

The Author

Richards W. Cotton has been chairman of the Electronics Production Board, DPA, and director of the Electronics Division, NPA, since June of this year. He is with the Government on leave of absence from the Philco Corp. where he was assistant to the President and Vice-President and Director of Philco International and a director of Philco Overseas, Ltd. Mr. Cotton's previous experience in government service includes the position of consultant to the Munitions Board after the Korean War. During World War II, he was Controlier of Signal Equipment as a "dollar a year" man for the British Air Commission, having the distinction of being the only American, so far as is known, to hold a high position in the British war organization. Mr. Cotton has been a "ham" operator since 1908.

Left to right: Richards W. Cotton, Chairman, Electronics Production Board, DPA; Director, Electronics Division, NPA; Brig. Gen. Troup Miller, Jr., USAF Director of Industrial Resources Deputy Chief of Staff, Materiel; Lt. Col. J. P. Gibbons, USAF, Chief Components Branch, Directorate of Industrial Resources, Deputy Chief of Staff, Materiel.

At first, the Board concentrated on breaking existing bottlenecks. For example, facilities had to be cleared for greatly expanded radar production—which alone consumes about 25 percent of the electronic dollar—and for modifying the production pattern of the entire electronics industry to provide military production at a rate now exceeding $200,000,000 monthly. But the electronics industry—already booming at the time of Korea—has never been slowed by the exceedingly narrow bottlenecks such as those which plagued the machine tool and aircraft industries. There were difficulties, however—the shortage of engineers was one. And there was trouble in getting nickel into the right places. But these problems never really became major ones.

Although the electronics production program was about 30 percent behind schedule at the beginning of 1952, the lag was due not so much to difficulties in the electronics industry as to difficulties in production of the equipment into which the items were to be placed.

Some of the lag, of course, was accounted for by design changes. It's the very familiar problem of whether to freeze design and go ahead with maximum production, or to limit production to accommodate new models.

The second phase of the Board's operations—the phase following the breaking of immediate bottlenecks—was that of anticipating bottlenecks,and avoiding them.

Since May of this year, however, the Board has been able to expand its interests, to take a look at some of the broader features of electronics production and how it fits into the whole preparedness program.

The first big problem which was tackled by the Board outside the field of production bottlenecks was that of spare-parts provisioning of equipment ordered by the military.

An EPB investigation showed that about $550 million in electronic components to be used as spare parts for equipment then in production had not yet been ordered largely because the Services could not agree on what to purchase, the amounts to be bought, or the prices to be paid.

The Board studied the situation and determined that spare-parts provisioning should be handled in a different manner. As a result, many prime contractors may now purchase parts when they purchase production parts. From a strictly book keeping and administrative standpoint, spare-parts provisions will thus be greatly sim-

plified. But there are other advantages in the new procedure, as well. It eliminated the short production runs and consequent higher costs which would occur if the Services ordered spare-parts at a later date.

Not all problems considered by the Board have such pat solutions. During recent months problems in five diverse fields have come before the Board for study, none of which lends itself to a simple solution. But they serve as examples of the very complex policy considerations which confront the Board.

The first of these considerations is this: "How long shall the U. S. continue to furnish spare-parts components for the electronics equipment which is being sent or which has been sent to the NATO countries?"

There is a great deal of merit in the proposition that we should sever the lines of dependency as soon as possible, that we should tell European manufacturers, "You make your own tubes for this equipment, because you can."

Seeing to it that the most frequently needed parts are manufactured in Europe would relieve much of the burden on our own electronics industry. It would decrease the drain on our own facilities and materials. It would broaden the mobilization base of the free world nations and would be a step in the direction of production self-sufficiency of the NATO countries. Certainly, reducing the diameter of the pipe line from the U. S. is a laudable goal.

But when we examine this goal many difficulties begin to present themselves.

The primary question must be: "Will the need for the tubes and other components be great enough to warrant the expense of tooling up these European manufacturers?" The second question centers around the fact that certain types of tubes are classified. To set up European production of these tubes would involve their declassification, which in turn opens the question of whether or not certain of them should be declassified.

Then there's the matter of maintaining a consistent Governmental policy with regard to all spare-parts for all equipment furnished the NATO countries, not just spare-parts for electronics equipment. If it is determined that the Government should follow a consistent over-all policy, then the question naturally must be resolved on a level higher than that of the EPB—perhaps at the State Department level, or by the Mutual Security Agency, or by the Department of Defense.

This matter of European production of components isn't illustrative of a particularly urgent problem coming before the Board—or for that matter, of a relatively important one—but it does show how the Board is investigating means of saving money, manpower, and materials.

Another recent concern has to do with crystals—whether equipment should be ordered from contractors with crystals furnished, or whether crystals should be procured separately and furnished by the Government.

The Navy's Bureau of Ships has already adopted the policy of ordering equipment without crystals and furnishing them to the contractor for insertion in the end equipment before shipping. The question is whether this practice should be made to apply to all Government procurement of end equipment requiring crystals.

On the surface, it would appear to be much simpler to order equipment complete with crystals. But even if it were simpler—which hasn't been determined to everyone's satisfaction—there is a more important factor, which, because of the long range goal of our mobilization program, might more than counterbalance the desirable feature of simplicity.

To understand this factor, it is necessary to explain something about the companies engaged in the fashioning of crystals.

The large companies all have facilities for manufacturing crystals, which ordinarily are sufficient to provide enough crystals to go around. But in times of emergency, they cannot meet the full demands. It becomes necessary for a number of smaller companies to get into production.

These smaller companies are, in a sense, boom-and-bust firms. During World War II they flourished, only to suffer a severe business depression in 1946 after the war. With Korea, these small manufacturers had to get into production again—and this takes time.

The question then arises as to how and to what extent we can keep these small crystal manufacturers going, so that they would be ready to swing into full production if the need were to arise.

Perhaps the best solution is one where the Government purchases crystals directly from these manufacturers, and issues them, as Government furnished equipment, to the end-items manufactued by the prime contractor. By the Government exclusively ordering, we will be able to keep firms in production long after the present tide of orders has subsided.

Another present interest of the Board is that of establishing alternative sources of supply. For example, in one case there is only one manufacturer producing a vital part. Although the facilities of this manufacturer are adequate for present needs, the danger of relying completely on a single supplier of a vital item is apparent. The EPB, through the Services, is now attempting to interest certain other manufacturers in producing this item.

The EPB will probably consider the advisability of the Services placing contracts simultaneously for end equipment and for the special test gear necessary for its maintenance and requiring the end equipment manufacturer to develop such test gear and deliver it concurrently with the end item.

Another item for discussion will probably be whether or not the EPB should suggest that the Services consider the advisability of placing incentive-type contracts with end equipment manufacturers to encourage the simplification of military electronic equipment.

These are five examples in five diverse areas showing how the EPB is working to save manpower and materials to reduce the load on the taxpayer, to develop a strong mobilization base, and to develop alternate sources of supply.

But EPB activities have not been confined to these. The Board recently has journeyed to Philadelphia to discuss with our Signal Corps people some of their special problems. Members have gone to plants to gain a closer understanding of some of the problems facing electronics producers. The Board has studied the problem of streamlining component coding, and has looked into many other matters where refinements in procedure appeared possible.

Our electronics production program has, we believe, developed with an unusual degree of orderliness. The EPB has contributed to this orderliness—but it has only contributed.

Thousands of individual decisions have been made by thousands of persons—both in and out of Government. On balance, these decisions have proved to be wise ones. It is for this reason. primarily, that we have achieved a solid and efficient Electronics Production Program, and can say that to our knowledge no aircraft, ship, or plane has been held up in delivery because the necessary electronic equipment was not ready.

from scientist

● *Army Teams Introduce New Products to Field Soldiers*

Immediately after the cessation of hostilities of World War II, scientists and engineers of the Signal Corps Engineering Laboratories located at Fort Monmouth, N. J., began concentrating their thoughts and efforts toward bettering Signal Corps equipments used during that conflict. As a result of this Research and Development Program, the Signal Corps has now vastly improved equipment over that which was used in World War II with particular emphasis being given to miniaturization and ruggedization, ease of operation and mobility.

The equipment you will read about in the following paragraphs was developed by the Signal Corps Engineering Laboratories and is now rolling off the production lines of our communications and electronic industries. Due to the large amount of new equipments being issued to troops in the field, the Chief Signal Officer has deemed it advisable to organize New Equipment Introductory Teams for the purpose of introducing the Signal Corps' newest products. This equipment is currently being demonstrated within the continental United States by a crack team of soldier specialists, who make up one of the Signal Corps' New Equipment Introductory Teams.

These teams do a big job for all the Armed Forces today.

Their mission is to assure that our fighting soldiers, marines, airmen and sailors are rapidly and thoroughly trained in the operation and maintenance of new Signal Corps equipment. Their mission is carried out by demonstrations to Commanders and Staff Officers, and by courses of instruction for instructor personnel of service schools and combat units throughout the United States and major overseas commands.

Each soldier on these teams is hand-picked for his technical know-how. Many have engineering degrees. Only a small percentage of those interviewed pass muster for assignment to New Equipment Introductory Teams.

These teams—and their new signal equipment—have a joint history, often dating from the earliest laboratory development model which in many cases these soldiers helped perfect. Many members of these teams receive specialized instruction at the manufacturer's plant before the first production models roll down the assembly line. And all have gone through an instructor's course in the latest demonstration and teaching techniques.

Next stop of these teams may be at any one of the service schools or commands within the U. S., or an overseas command where they will give comprehensive courses of instruction for selected instructor and supervisor personnel. These courses cover installation, operation and maintenance of new items of signal equipment. Already these teams have introduced equipment to the Armed Forces of the Far East Command (including the Korean combat zone), Panama Canal Zone and to troops of the European Command, as well as to a large number of service schools within the U. S.

In each case the arrival of New Equipment Introductory Teams is timed with the issue of new equipment to units. Completing their instruction, teams leave lesson plans and training aids with the newly-taught instructors, who thereupon begin large-scale indoctrination of troops who will shortly use the equipment.

Mission completed, teams return to the Signal Corps Engineering Laboratories, and the cycle begins again—for a still newer equipment.

In the following paragraphs a brief sketch is given of some of the better known new equipments which are just being issued.

A new field switchboard, the SB-22/PT, has been developed under Signal Corps contract with Federal Telecommunications Laboratories. It weighs only 22 pounds and has twice the capacity of some of the much heavier equipment it will replace. It will operate on both wire and radio circuits. It has retractable cords which will stay clear of battlefield mud and water. When not in use, it can be folded into a case and carried like a portable typewriter. Circuit components are contained in units which can be quickly and easily replaced in event of failure—the "building block" principle. Interchangeability of parts with other types of switchboards will minimize repair and maintenance problems. And—once more applying the "building block" principle—the equipment can be easily expanded to provide greater capacity. Each board has a 12-line capacity, but it is possible to stack as many as three boards atop one another. Then we get, not 36 lines, but 46 lines as a maximum—with some slight circuit modifications.

to soldier

Field wire itself has been greatly improved, and has been in highly successful use in Korea for more than a year. Developed by the Signal Corps Engineering Laboratories, Fort Monmouth, New Jersey, the new wire (called WD-1/TT) weighs only 46 pounds per mile, compared with 140 pounds per mile for World War II standard field wire. The new wire has no rubber in the insulation. It has a talking range of approximately 12½ miles. Companion item to the new wire is an improved dispenser (MX-306/G) with the wire coiled inside it. The dispenser will hold up—to half a mile of wire, yet is only a little over a foot in diameter. Packed with a half-mile of the new field wire, the weight is only 26 pounds. The wire can be released from this dispenser by packboard from a soldier's back, without the use of his hands. It also can be released from an airplane (at speeds up to about 100 miles per hour) or from any land or amphibious vehicle. Several dispensers can be connected in tandem and the wire strung without stopping to make a splice.

Another equipment — already in Korea—which will help bring printed messages far forward in the combat zone is a portable teletypewriter. Developed with the Kleinschmidt Laboratories, Inc., and called the AN/PGC-1, it is the forerunner of other new light-weight, high-speed teletypewriter equipment now under development. The AN/PGC-1 in overall assembly weighs 116 pounds and replaces equipment weighing over 400 pounds. It has 300 fewer parts than the equipment it is replacing. It can transmit and receive messages at 100 words per minute, 66 per cent faster than the old equipment. It is waterproof, and could be floated onto a beach in amphibious operations. It will operate on both radio and wire circuits, and because it requires less line current, it can be used over longer field wire circuits than the equipment it is replacing.

Dramatic developments also have been made in radio equipment for the combat level, particularly the new walkie-talkie, handie-talkie, and series of vehicular radio sets.

The new walkie-talkie (AN/PRC-10) radio set, developed under Signal Corps contract with the Radio Corporation of America, is a radically new equipment. It has about one-half the weight and bulk of the World War II model, which itself represented a vast improvement over earlier sets. Actually, the new Walkie-talkie comes in three closely related models (AN/PRC-8, 9, 10) for Armor, Artillery and Infantry, respectively. First to go into production was the AN/PRC-10 for Infantry, but the three together will help greatly to knit the combat arms into a fighting team. Because the new walkie-talkie is FM (like in the integrated communications system at the combat level) it has a range up to five miles, carying with terrain and type of antenna used. (See Figure 1)

Fig. 1. The Handie-Talkie radio set goes farthest forward with combat troops and will operate with the Walkie-Talkie and other FM front line equipment.

Fig. 2. The new Walkie-Talkie (AN/PRC-10) radio set has one half the weight and bulk of the World War II model.

Fig. 3. The Radiac Set used above is capable of detecting the intensity (dosage rate) of both Beta and Gamma radiations.

In a like manner, and with similar objectives, the Signal Corps has developed an improved handie-talkie (AN/PRC-6) radio set in conjunction with the Raytheon Manufacturing Company. Also frequency modulated, the handie-talkie—the radio which goes farthest forward with the combat troops—will operate with its big brother, the walkie-talkie, and with other FM front-line equipment. It is about the same size and weight as the World War II handie-talkie, but is completely redesigned and gives vastly improved performance. It is now in production, as another important link in the integrated communications system for the combat area. Its range is about one mile. (See Figure 2)

There is an important series of front-line, vehicular, FM, voice radio sets—or, more correctly, a series of *Major components* out of which a wide variety of sets can be made. This is an AN/GRC-3 to 8 series, developed under Signal Corps contract by the Bell Telephone Laboratories. The series is considered the keystone of integrated communications in the combat zone. The major components can be shifted into a great variety of different sets; more than 20 such assemblies have been classified as standard for issue throughout the Army, and many more combinations are possible if needed. Again, this is the "building block" principle in application. The sets built up from these major components, being FM, will operate with the new walkie-talkie and handie-talkie. The application of the "building block" principle simplifies maintenance and repair in the field, because whole components can be changed in a hurry. The sets have a range of about 15 miles, but two sets can be linked together for automatic re-transmission of voice messages over longer distances.

Using the World War II high power mobile radio station (SCR-399) as a foundation, the Signal Corps has made improvements in design and modernization with a mobile radio teletype unit (AN/GRC-26). This new equipment, which has

(*Continued on page 77 col. 1*)

In the last issue we described the FROMO-WENNELIZER type of transmitter as employed at the Sayville, Long Island transmitter in 1917 and thereabouts. So far as our records are concerned, this was the only transmitter of this type in the United States. Never-the-less, 142 of our readers correctly tagged it as the JOLY-ARCO Undamped Wave Transmitting System. Now have a go at the

DOING IT THE HARD WAY

SCHNICKLEFRITZ ALTERNATOR*

By Lt. Col. Arthur K. Ransom

In the words of a hallowed and long-forgotten publication ". . . . . By adopting the simple principles of electrical resonance, Dr. Schnicklefritz has designed an alternator which, by the use of a single armature, generates radio current at frequencies from 30,000 to 75,000 cycles per second. The great advantage of this alternator is the low speed of the armature, which even in the 200 K.W. sizes, does not exceed 3,100 R.P.M.

"It will be observed from the diagram that in addition to the stator and rotor windings of the usual alternator, a number of external inductance coils and condensers are connected in both the shunt and rotor circuits, which are employed for tuning these circuits to several frequencies. In fact, by correctly proportioning the inductance and capacity, current at a frequency of 60,000 cycles per second can be taken from the field winding, and if made to flow in a properly tuned antenna circuit will radiate waves, 5,000 meters in length.

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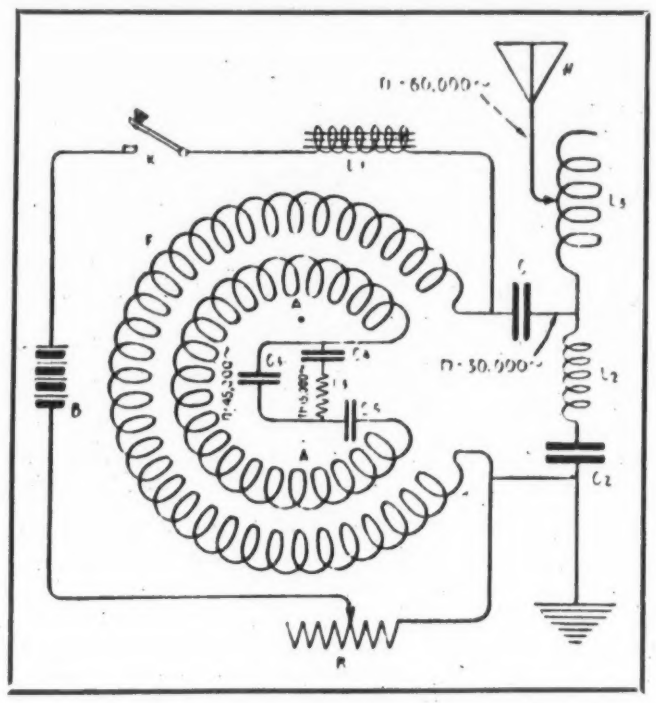

will assist in an understanding of the operation of this generator if one will but consider the following well-known phenomenon: If a common alternating current generator armature revolves at such speed as to generate an initial current at a frequency of 60 cycles per second, and the field coils, for example, are mechanically rotated in the opposite direction at a similar speed, it is plain that the relative motion is doubled and therefore the frequency is doubled. It is also established that we might dispense with the revolving appliances for the field coils and pass an alternating current of a given frequency through a stationary field winding. If the speed of the armature is N^1 revolutions per second and the frequency of the field current N cycles per second, there will be induced in the armature e.m.f.'s of two frequencies, one of N / N^1, and another of $N - N^1$. In case N and N^1 are just equal, then, the frequency of the current induced in the armature will be N / N^1 or 2N, and $N - N^1$ or zero. Hence, if current of 60 cycles flows through a four pole field winding and the armature is driven at 30 revolutions per second, current at a frequency of 120 cycles per second will be generated in the armature. The design of Schnicklefritz's alternator is such that when driven at normal speed, the initial frequency of the current generated in rotor A is 15,000 cycles per second. Since the inductance and capacity of the rotor circuit are selected to give a natural time period of oscillation suitable to the fundamental frequency, an alternating current of considerable intensity flows in the armature windings A, C-4, L-3, C-5.

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* * * * *

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Field wire itself has been greatly improved, and has been in highly successful use in Korea for more than a year. Developed by the Signal Corps Engineering Laboratories, Fort Monmouth, New Jersey, the new wire (called WD-1/TT) weighs only 46 pounds per mile, compared with 140 pounds per mile for World War II standard field wire. The new wire has no rubber in the insulation. It has a talking range of approximately 12½ miles. Companion item to the new wire is an improved dispenser (MX-306/G) with the wire coiled inside it. The dispenser will hold up to half a mile of wire, yet is only a little over a foot in diameter. Packed with a half-mile of the new field wire, the weight is only 26 pounds. The wire can be released from this dispenser by packboard from a soldier's back, without the use of his hands. It also can be released from an airplane (at speeds up to about 100 miles per hour) or from any land or amphibious vehicle. Several dispensers can be connected in tandem and the wire strung without stopping to make a splice.

Another equipment — already in Korea—which will help bring printed messages far forward in the combat zone is a portable teletypewriter. Developed with the Kleinschmidt Laboratories, Inc., and called the AN/PGC-1, it is the forerunner of other new light-weight, high-speed teletypewriter equipment now under development. The AN/PGC-1 in overall assembly weighs 116 pounds and replaces equipment weighing over 400 pounds. It has 300 fewer parts than the equipment it is replacing. It can transmit and receive messages at 100 words per minute, 66 per cent faster than the old equipment. It is waterproof, and could be floated onto a beach in amphibious operations. It will operate on both radio and wire circuits, and because it requires less line current, it can be used over longer field wire circuits than the equipment it is replacing.

Dramatic developments also have been made in radio equipment for the combat level, particularly the new walkie-talkie, handie-talkie, and series of vehicular radio sets.

The new walkie-talkie (AN/PRC-10) radio set, developed under Signal Corps contract with the Radio Corporation of America, is a radically new equipment. It has about one-half the weight and bulk of the World War II model, which itself represented a vast improvement over earlier sets. Actually, the new Walkie-talkie comes in three closely related models (AN/PRC-8, 9, 10) for Armor, Artillery and Infantry, respectively. First to go into production was the AN/PRC-10 for Infantry, but the three together will help greatly to knit the combat arms into a fighting team. Because the new walkie-talkie is FM (like in the integrated communications system at the combat level) it has a range up to five miles, carying with terrain and type of antenna used. (See Figure 1)

Fig. 1. The Handie-Talkie radio set goes farthest forward with combat troops and will operate with the Walkie-Talkie and other FM front line equipment.

Fig. 2. The new Walkie-Talkie (AN/PRC-10) radio set has one half the weight and bulk of the World War II model.

Fig. 3. The Radiac Set used above is capable of detecting the intensity (dosage rate) of both Beta and Gamma radiations.

In a like manner, and with similar objectives, the Signal Corps has developed an improved handie-talkie (AN/PRC-6) radio set in conjunction with the Raytheon Manufacturing Company. Also frequency modulated, the handie-talkie—the radio which goes farthest forward with the combat troops—will operate with its big brother, the walkie-talkie, and with other FM front-line equipment. It is about the same size and weight as the World War II handie-talkie, but is completely redesigned and gives vastly improved performance. It is now in production, as another important link in the integrated communications system for the combat area. Its range is about one mile. (See Figure 2)

There is an important series of front-line, vehicular, FM, voice radio sets—or, more correctly, a series of *Major components* out of which a wide variety of sets can be made. This is an AN/GRC-3 to 8 series, developed under Signal Corps contract by the Bell Telephone Laboratories. The series is considered the keystone of integrated communications in the combat zone. The major components can be shifted into a great variety of different sets; more than 20 such assemblies have been classified as standard for issue throughout the Army, and many more combinations are possible if needed. Again, this is the "building block" principle in application. The sets built up from these major components, being FM, will operate with the new walkie-talkie and handie-talkie. The application of the "building block" principle simplifies maintenance and repair in the field, because whole components can be changed in a hurry. The sets have a range of about 15 miles, but two sets can be linked together for automatic re-transmission of voice messages over longer distances.

Using the World War II high power mobile radio station (SCR-399) as a foundation, the Signal Corps has made improvements in design and modernization with a mobile radio teletype unit (AN/GRC-26). This new equipment, which has

(*Continued on page 77 col. 1*)

In the last issue we described the FROMO-WENNELIZER type of transmitter as employed at the Sayville, Long Island transmitter in 1917 and thereabouts. So far as our records are concerned, this was the only transmitter of this type in the United States. Never-the-less, 142 of our readers correctly tagged it as the JOLY-ARCO Undamped Wave Transmitting System. Now have a go at the

DOING IT THE HARD WAY

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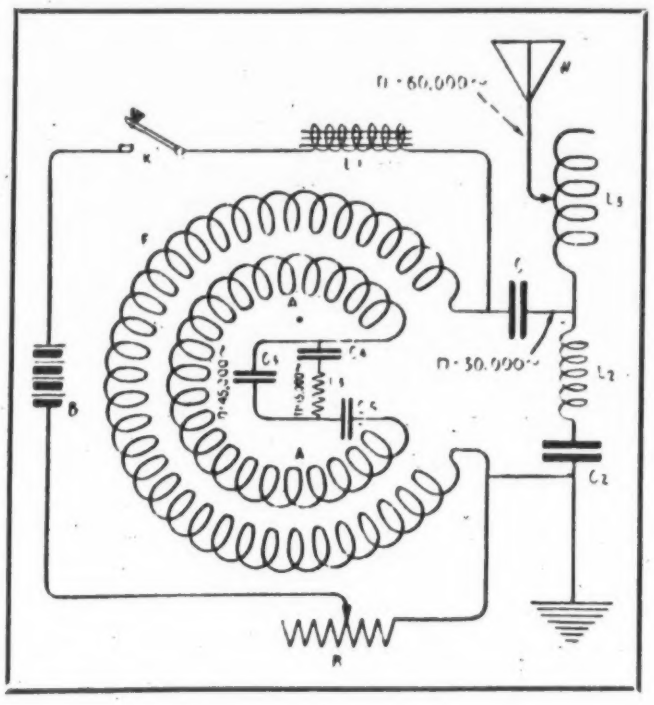

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Navy F

Above: Navy Frogmen train for undersea photography at Silver Spring, Florida. Keeping your "footing" means treading water.

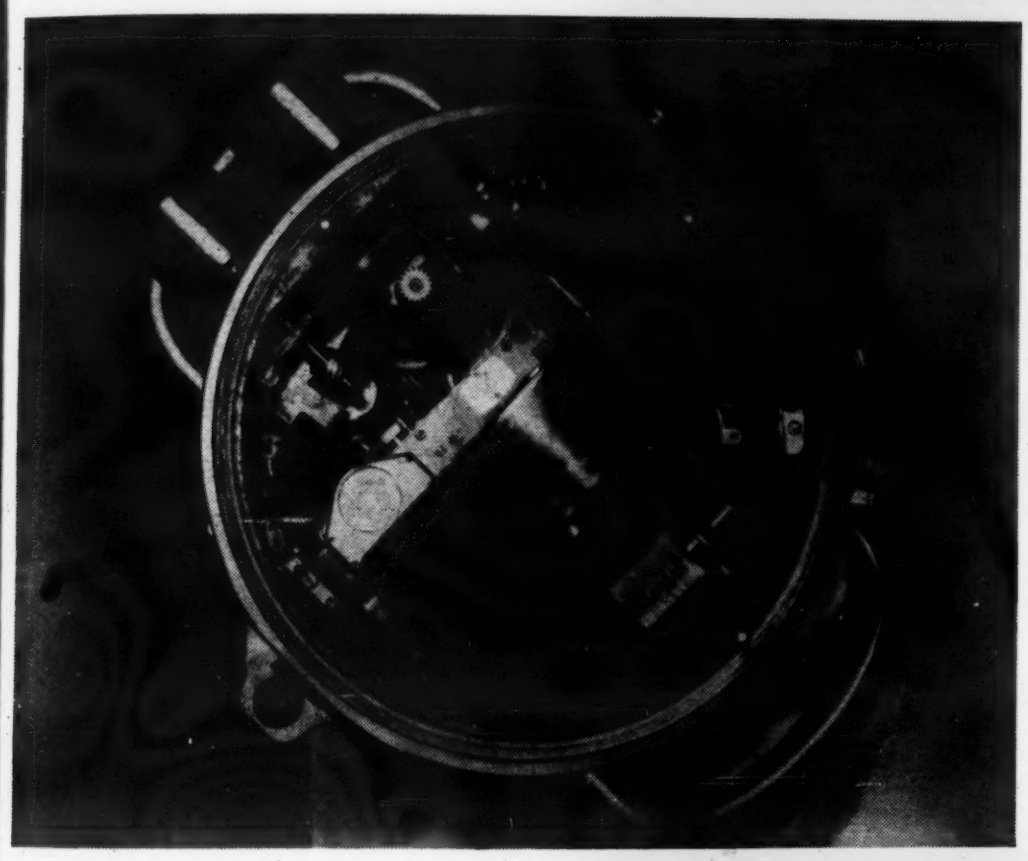
Right: Walking through underwater vegetation can present the problem of keeping lines free. This diver makes his way through heavy grasses while adjusting his air lines.

Left: Photographers and divers cooperate to locate subject material. These photos were made while a training film was in progress at Silver Spring.

Frogmen

Official U. S. Navy Photos

Right: Men above water keep careful watch on equipment and positions of Frogmen.



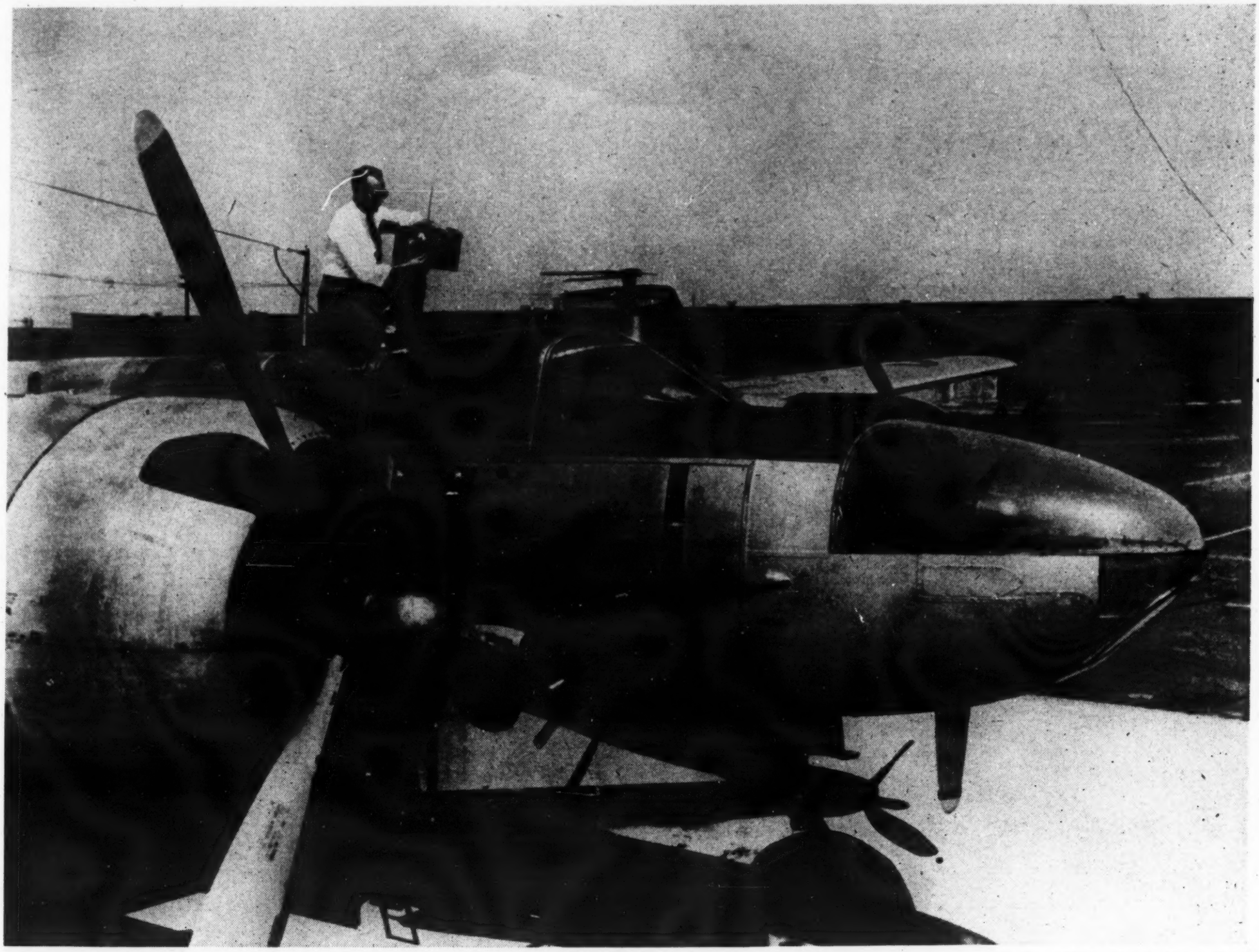
Left: Photographic equipment used for underwater photography—35 mm picture camera and 400 film magazine in front section of underwater blimp. On right hand side are motion and electrical connections. On left can be seen, view-finders, pressure gauge, internal exposure meter and tachometer.

Right: Three men with compressed air units at depth of 45 ft. during camera tests. These men encountered barracuda fish and moray eels in such coral caves without accident.

KOREA bound bombers get fast

RADIO OVERHAUL

By American Electroneering



Douglas Attack Bomber B-26 VHF and navigational radio gear is checked by American Electroneering Corporation Glide Path Test Set.

A veteran of long, hard, and heroic fighting during World War II, the famous Douglas Attack Bomber B-26 finished the fracas in a blaze of glory then settled back to rest on its laurels. This rest was short lived. With the outbreak of Korean hostilities, the deadly speedster was recalled to active duty and is now once again winging its way over the front lines with devasting efficiency.

Putting these veterans back into service called for a fast, dependable reconditioning program. This was carried out at the Douglas plant in Long Beach California.

Close care and attention was given to everything on the ships, but particular emphasis was placed on the overhaul and calibration of the planes' radio and navigational gear. With today's warfare utilizing intensive close ground-air support, and with the new, advanced electronic assistance available for bad weather landings, it was vital that all VHF equipment be right, and calibrated to *stay* right.

For many years, Douglas has been purchasing all the electronic test units manufactured by American Electroneering Corporation to provide laboratory and ramp tests on Douglas Aircraft. It was natural therefore that Douglas turn over the job of VHF overhaul to this Los Angeles firm.

The first step was to remove the equipment and take it to the firm's large production plant. Here every unit, every component, and every hook-up was completely overhauled and rebuilt to bring the gear up to the point where it would perform with unfailing accuracy and precision. The work at the plant was completed in record time.

After this complete program, all the equipment was returned to the field for final check-out. The initial check was done in the Douglas labora-

tories with the American Electroneering's ILS Signal Generator TS/67-C-1. This is a crystal controlled unit, which supplies signals for sensitivity measurements and alignment of glide slope and localizer receivers. The set is calibrated for RF output on glide path channels GX, GY, and GZ with 20.7 Mc for intermediate frequency alignment of the glide slope receiver. It is also calibrated for RF output on channels U,V,W,X,Y and Z, with 6.9 Mc for the intermediate frequency alignment of the localizer receiver. Attenuators are provided to couple the RF output to receivers under test.

One of the features of the TS/67-C-1, is its ability to modulate any frequency with 90, 150 or 1000 cps, or to unmodulate the same frequencies as desired. Simultaneous modulation at 90 and 150 cps may be varied in relative amplitude 4db in either direction to check balance and deflection sensitivity characteristics of receiver indicator circuits.

Following this complete bench check of the VHF and navigational radio sets, the gear was then placed in position aboard the ships. From here, with the planes ready to go, it was a fast simple matter to give a final check on the line with American Electroneering's portable Localizer, Glide Slope, and Marker Beacon test sets. These are battery operated test oscillators which provide crystal controlled signals obtainable by radiation from antenna or from piston type attenuators for direct connection to receiver outputs. 30% modulation is provided from internal source, or unmodulated as desired.

The results of the overhaul, and the thoroughness of the checking were very gratifying as they turned out the fighting ships in record time, eliminating flight line bottlenecks. The planes were delivered to the Air Forces tuned for peak performance, to help the crews complete their missions more effectively with considerable safety added to any radio controlled landings that might be necessary.

In addition to the many different laboratory and portable test equipments, and compact regulated power supply units, American Electroneering has recently developed a completely new ILS Signal Generator. The new unit is tagged AEC-200 and has the exclusive advantage of being the first completely portable test set which will provide a continuously variable omni bearing check from 0° to 360°, all done on the ramp without moving the plane or without removing any of the planes' gear.

One of the outstanding features is the fact that the AEC-200 has a regulated power supply operating either from 105-120 vac, 60 cycles; or from 22 30 vdc at 5 amps. It also provides accuracy to within 1°.

The AEC-200 already is in use at Northrup Aircraft with other large manufacturers and airlines also planning its use.

American Electroneering Corporation shows a rapid growth. Started in 1947 as a sales organization, the Los Angeles firm has expanded into a large, well known electronic manufacturing concern performing prime contract work for the Air Forces, aircraft manufacturers, and airlines, and are currently completing a half-million dollar contract with Firestone Tire and Rubber Company for production of Corporal Missile Electronic packages.

In the communication field, American Electroneering is producing radio equipment for the Bureau of Reclamation and for many airports in the United States. The company specializes in "high level" AM modulation Radio Transmitters in the power ranges of 50 to 500 watts for mobile and point-to-point applications covered by Western Electric license. Considerable work is being done in the Microwave field for radar applications of a classified nature. American Electroneering is principally interested in electronic production to customer's specification.

President and General Manager of the firm is Remy L. Hudson, for many years a prominent executive in large production electronics manufacturing. Chairman of the board of directors, and sales director is Lee G. Snyder, who is an electronic and electrical engineer by profession having had some twelve years experience as electronic and radio design engineer with major aircraft companies, with experience totaling more than 20 years in commercial and military electronics. He is also a Navy officer radar trained technician. He was at one time chief electronic officer of the Naval Air Test Center, Patuxent River, Maryland, supervising the testing and maintenance of all new Navy electronic radio and radar equipment under assimilated combat conditions.

Mr. Snyder and Mr. Frank Rupentahl are coordinating the contract between Douglas and American Electroneering. Both of these men are well experienced in engineering and management coordination.

Controlling interest of the corporation is held by M. L. Joslyn of the Joslyn Chicago and Pacific Pole Line Hardware Corporations.

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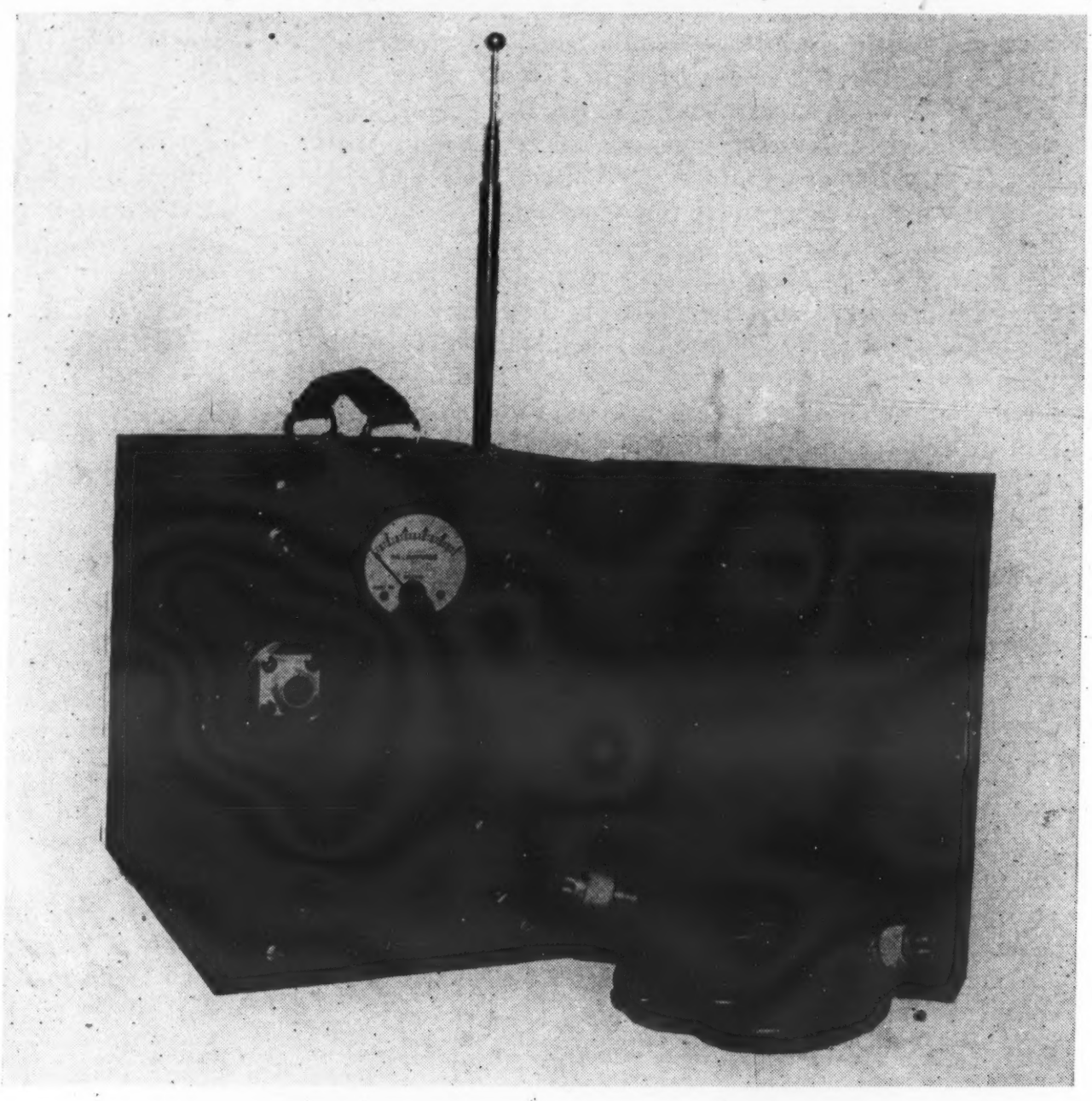
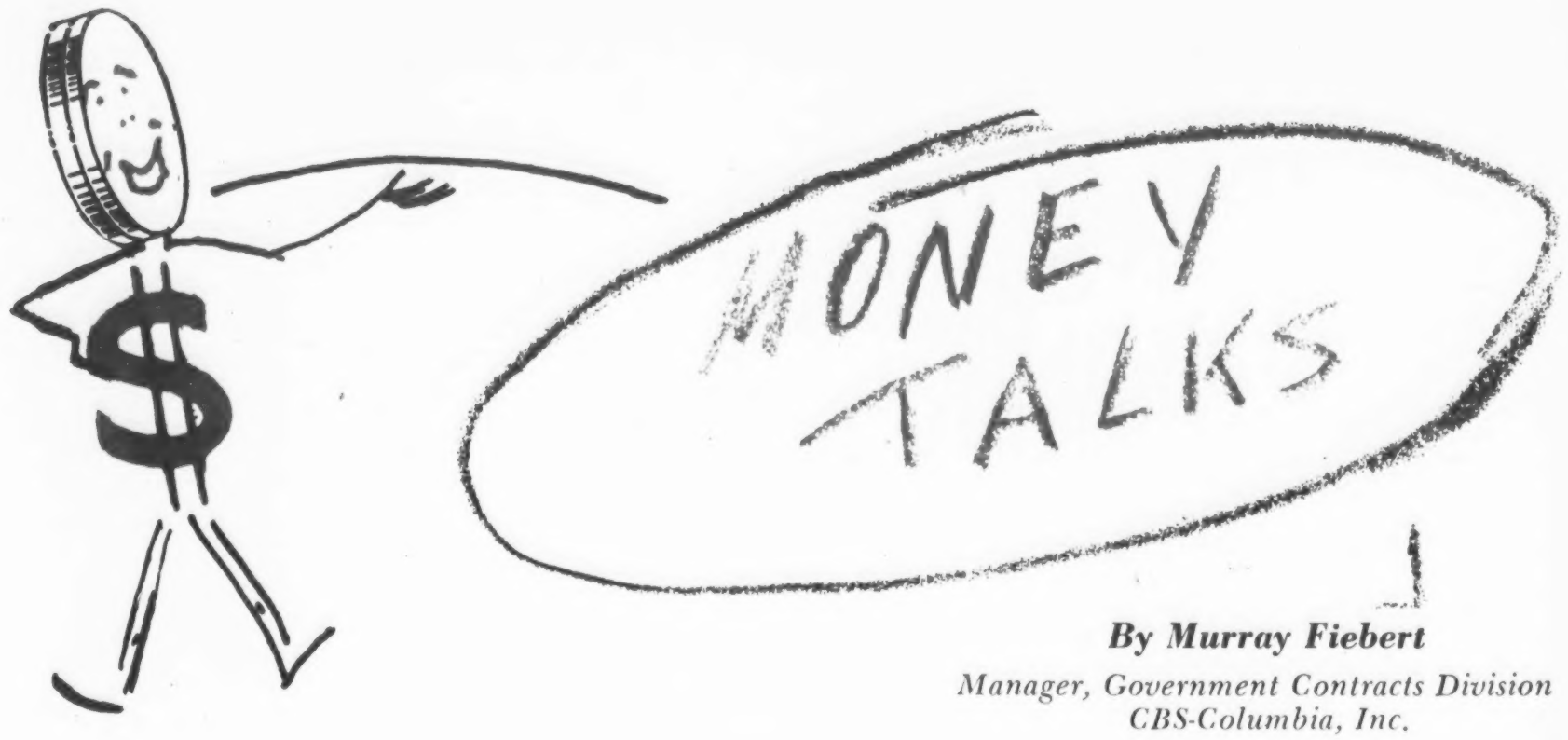
Glide Path Test Set (AEC-170) pictured below, is unit used to check VHF and navigational radio gear on Douglas G-26. The AEC-170 is entirely self contained.





By Murray Fiebert

Manager, Government Contracts Division
CBS-Columbia, Inc.

There is no business like Government business. The annual expenditures of ninety billion dollars by Uncle Sam make the military program the greatest show on earth. With the accent on economy, an assessment of Armed Forces procurement methods is most pertinent. Congress is reviewing present day procurement procedures with a jaundiced eye.

Companies doing business with the Armed Forces have a vested interest in the overall procurement program. This interest is not primarily a selfish one. It is a matter of grave concern to the national interest.

A review of the procurement picture will place certain facts in perspective. Subsequent to the end of World War II the Armed Forces continued to buy supplies and equipments totalling many billions of dollars annually. Their problems were complex and varied. After the war ended, it was almost impossible to obtain suppliers interested in doing business with the military. Most firms were converting production to civilian lines. Procurement officials had to locate new sources. The companies producing war materials had scrapped their tools and dies and were concentrating on the production of "bread and butter items."

As time went by, it was apparent that Congressional appropriations for the Armed Forces did not materially diminish. Manufacturers noticed that the Services became one of the most important customers of the post-war economy. Almost overnight a new trend developed. The influx of bidders to government agencies became endless. A post war procurement boom was created and resulted in new and many problems for buying agencies. Government offices were handicapped by limited personnel ceilings and lack of experienced administrative and technical personnel needed to handle the increased volume of work. Despite these difficulties, the overall results achieved by most procurement offices were regarded as largely successful. A tremendous post-war procurement program was launched despite criticisms and dissatisfactions present in any large project. Satisfactory performance does not imply that considerable improvement was not possible or warranted. To the contrary, a recommendation is being made which will affect the entire military procurement system of our country.

The present procurement organization provides that the Army make its purchases through the Chief of each Technical Service or Department. Each Chief of a Technical Service is responsible for every phase of procurement effected by his Service, i.e., Transportation Corps, Engineer Corps, Signal Corps, Ordnance, etc. Each Technical Service has its separate organizational setup with offices scattered in various parts of the country. On the other hand, the Air Force has an organizational setup that is essentially a centralized procurement establishment located at Wright-Patterson Air Force Base, Dayton, Ohio. With certain exceptions of research and development items, and local procurements, all purchases are made at Dayton. The Navy procures through its different Bureaus, with its main office located at 17th and Constitution Avenue, Washington, D. C. The Navy also makes certain purchases through separate procurement activities at different Naval installations throughout the country.

This maze of procurement organizations is enough to thoroughly confuse the average contractor in his initial approach to a procurement agency. Despite a considerable amount of literature and printed matter calling attention to the ease with which a contractor can get into the Government procurement cycle, a business man must be prepared to spend much effort, time and money before he can hope to establish himself as a source. To illustrate, an electronic manufacturer would have to contact the following agencies if he desired to be accorded a personal interview with contracting officers:

Air Force—Wright-Patterson Air Force Base—Dayton, Ohio

Navy—Dept. of Navy—17th and Constitution Ave., Washington, D. C.

Signal Corps—Signal Corps Supply Agency—225 S. 18th St., Phila., Pa.

Each Agency operates a separate procurement agency, *and in each case performs functions which are being overlapped by a procurement agency in another office.* This constitutes a fabulously extravagant waste of taxpayers' money, promotes inefficiency, and retards the defense effort.

It is recommended that the following proposal be taken under consideration for the purpose of achieving maximum efficiency, savings, and carrying out the intent as well as the spirit of the recent Unification Plan:

1) It is recommended that all procurement activities be transferred from the jurisdiction of the Chiefs of Technical Service and placed directly under the jurisdiction of the Secretary of Defense. The Secretary of Defense, or an assistant, should be designated as the civilian

(*Continued on page* 80 *col.* 1)

Electronics in SPACE

By Charles DeVore
Naval Research Laboratory

Opinions differ as to when—or whether—space flight will be achieved, but there is little doubt that electronics will play an important role in any such accomplishment.

The Naval Research Laboratory is not building space ships, nor planning trips to other planets, but it is using rockets for upper-atmosphere research and electronics has been essential to the success of the experiments to date.

Scientific studies of the upper atmosphere, using rockets for the research vehicle, were begun at NRL in 1946. Under the direction of Dr. Homer E. Newell, Jr., head of the Laboratory's Rocket Sonde Research Branch, this research program aims to extend man's basic knowledge of:

(1) the physical state of the earth's atmosphere to as great an altitude as possible, with temperatures, pressures, densities, and composition principal objects of study;

(2) the fundamental nature and properties of the ionosphere and those processes which lead to its formation;

(3) solar and terrestrial radiation; and

(4) the physics of high-energy particles by high-altitude cosmic ray studies.

It is expected that the basic information gained will be of practical benefit in radio communication, meteorology, and the guided missile program.

Using rockets for upper-atmosphere research sounds like an obvious idea, in view of the heights they can obtain. But when it was first proposed to use rockets for research, scientists had some doubts. True, the rocket could carry instruments to great heights. But how about these factors: restriction on weights and sizes of experimental equipments; missile acceleration and vibration; recovery of photographic and other records from the rocket's wreckage; relatively short flight time of the rocket; supersonic speeds; flight characteristics of the rocket—spin, roll, and tumble? But the scientists decided the advantage of carrying scientific instruments aloft outweighed the unknown factors, which, they also felt, could probably be handled. Looking back, they are naturally gratified that this has been true.

The German V-2 rockets captured at the end of the war provided the first research vehicles for the scientists. NRL, as well as the other military services, have used V-2 rockets for many experiments. They have also used the Aerobee, a smaller sounding rocket which can reach heights up to 80 miles, with a 150-pound payload of scientific instruments.

Since the supply of V-2's is limited, and since the Aerobee is not completely satisfactory for upper-atmosphere research experiments, NRL conceived and developed a new single-stage rocket, the Viking, specifically for this purpose. This is a 5½ ton, 48-foot long missile, built by Glenn L. Martin Company, powered by a rocket motor of 20,000 pounds thrust, and capable of carrying a maximum instrument payload of 1500 pounds. In August, 1951, Viking 7 carried instruments to a height of 136 miles, a record for a single-stage rocket.

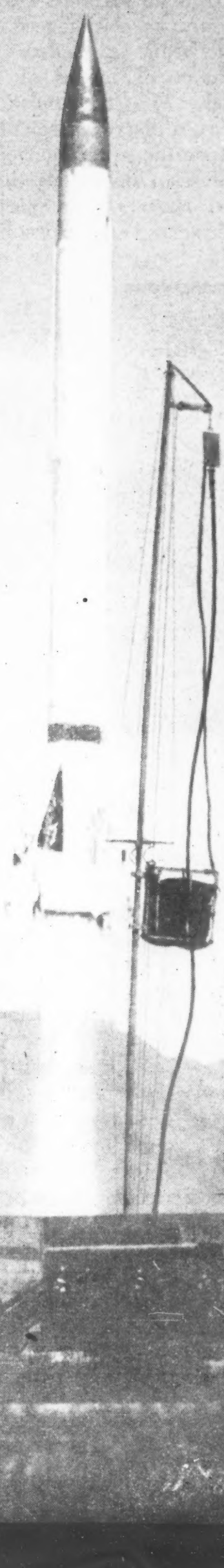
When rockets were first proposed for upper atmosphere research, it was supposed that radio means would have to be depended on exclusively for recovery of scientific data. This has not been entirely true, but electronic instrumentation has been essential.

In view of the cost of a rocket experiment, it is desirable to make as much use of the instrument space as possible. This factor automatically suggests the need for multi-channel telemetering systems. NRL secured satisfactory operation from its Sequential Telemetering System on 33 V-2 flights, in terms of usable record versus total flight time, but decided that any further production should have improved performance characteristics.

At the end of 1946, the Rocket Sonde Research Branch decided that the new system should incorporate the following improvements:

(1) Peak output pulse power of at least 3 kw (4 kw was achieved)

(2) A minimum of 30 input channels, with an increase in the sampling rate per channel to at least 300 samples per second



(3) Reduction of cross talk between channels to less than ¼ percent

(4) An over-all accuracy of at least one percent, to be obtained by a six-point voltage calibration at frequent intervals throughout flight

(5) Independence of decoding and recording units from noise pulse interference

(6) Utilization of complete channel input protection against overvoltages, with a separate input board for protection and calibration connections

(7) More flexible packaging of the rocket-borne units

(8) Lower total weight

(9) Constant indication regardless of varying instrument impedances

(10) Independence of channel triggers from preceding channels.

With these considerations in mind, the Matrix Telemetering System was conceived and designed by the Naval Research Laboratory. The ground station equipment, in use at White Sands Proving Grounds, was built by NRL while the rocket-borne transmitters were built on Navy contract by the Hazeltine Electronics Corporation. This system has also been used by the Army Ordnance Corps and the Air Force in their upper atmosphere research pograms.

Ground receiving station equipment provides ten recording cathode ray scopes for recording thirty channels of information on continuous film strips.

The Matrix Telemetering System uses pulse-position modulation on an amplitude-modulated r-f carrier of 1025 mc. The basis of the system is a pair of oscillators in the airborne and ground equipment. These oscillators are accurately synchronized in both frequency and phase to establish time reference frameworks, or matrices.

Data in the form of d-c voltages are supplied to the rocket-borne transmitter from the various experimental equipments carried in the nose or warhead of the rocket. The data channels are read successively and the whole process is repeated at a 312.5-cycle rate. A coded triple-pulse identifies the start of each cycle and establishes the start of a time reference framework, or matrix, of 32 intervals of 100 microseconds each. Within 30 of these intervals, single data pulses occur, the position of each pulse within its interval indicating the voltage being measured on the channel. This chain of pulses is used to modulate the r-f transmitter.

The ground station receives the recurrent train of pulses from the transmitter by means of a suitable receiver. The triple-pulse is recognized by a discriminator and is used to initiate the generation of a matrix of pulses having exactly the frequency and phase of the matrix in the transmitter. From this, signals are obtained at any particular time in the matrix and are used to generate the sweep voltages for the cathode-ray tubes on which the data are presented as intensity modulation. Pulses generated at the beginning and end of each matrix interval are also applied to the display, and the cathode-ray tubes are photographed on a continuous film camera. There results a graph of the variation of the input voltage with time, with reference lines (which do not vary in position) between each of the data lines.

The ground station has ten cathode-ray tubes on which the 30 data channels are applied; a fixed presentation of three channels per scope is used. Sweps of appropriate duration and timing with respect to the triple-pulse are so arranged that one tube after another is swept in succession until all channels are recorded. The indication of time from a standard source is also supplied on the record by the application of appropriate signals to the cathode-ray tube. Calibration may be performed by the periodic application of a series of voltages to each channel in turn in the airborne equipment, in place of the data inputs.

Since the spring of 1948, this system has produced usable records for NRL scientists in over 20 rocket flights. A number of improvements, however, have added to the reliability, usefulness, and accuracy of the equipment.

The chief improvement has been in the quality of the photographic records obtained on the ground equipment, allowing readings of equal accuracy at all positions across the film. This has been secured through the replacement of the existing camera lenses with Eastman Ektar enlarging lenses, designed for wide-angle projection at short image distances and characterized by a substantially flat field of focus and through design of a circuit which provides dynamic focusing of the cathode-ray tube.

Additional circuit improvements were incorporated in the new monitor racks which feature a special mechanical construction that allows the various component decks to slide from a normal to a servicing position; flexible cables permit full operation in either case. To facilitate repairs and testing of the equipment, the main chassis are built with the tubes extending downward and the wiring exposed on the top side. Power-supply decks are built in conventional fashion with the tubes replaceable from the top.

Using this system, data can be continuously recorded and later evaluated on such factors as atmospheric pressures during flight; rocket's velocity and altitude; aspect or vertical position of the rocket in flight, as determined by the pitch, yaw, and roll gyroscopes; power plant performance of the rocket's flight stabilization system.

For the smaller rockets, specifically the Aerobee, NRL has designed and built a "miniature" 15-channel telemetering transmitter. This new transmitter also uses pulse-position modulation on an amplitude-modulated r-f carrier, with a carrier frequency of 227 mc and a peak output power of 10 watts during the three megacycle pulses. Although each of the 15 channels is sampled 312.5 times a second, four channels can be used to give a

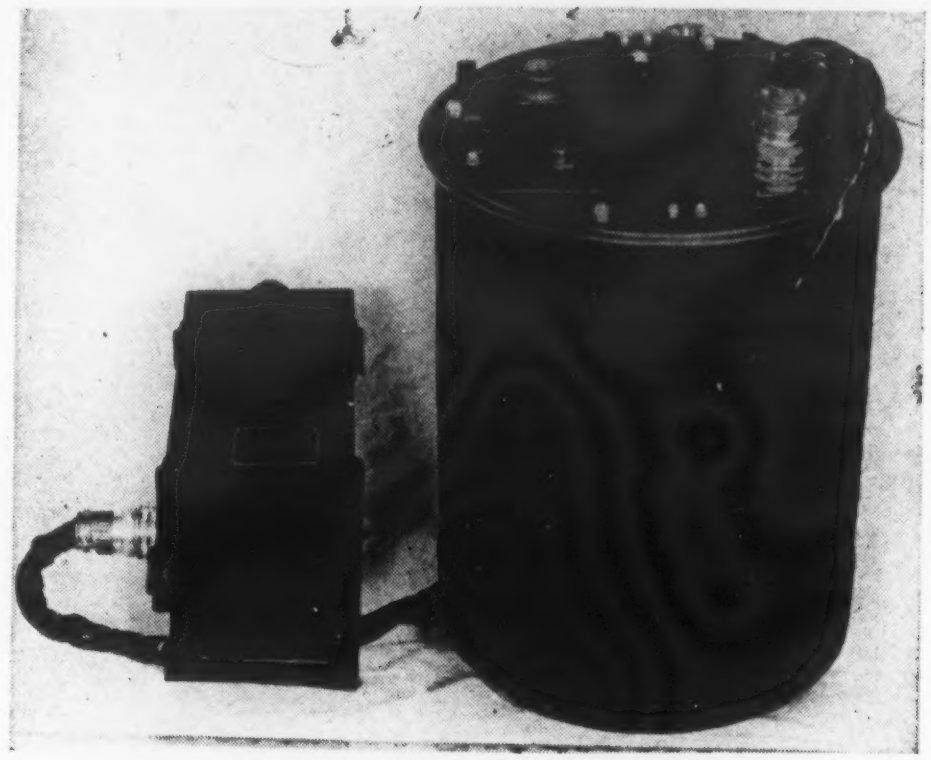
single channel with a sampling rate of 1250 if needed.

Exclusive of batteries, the transmitter weighs 18 pounds and is approximately 9 by 12 by 9 inches overall, including plugs and mountings. Power for an operating time of 45 minutes is supplied by 20 pounds of batteries occupying 230 cubic inches. Contained in a pressurized case, the transmitter chassis is constructed in two sections which are folded together to allow access to the interior of the cubical mass and are made of heavy aluminum to control the heat generated in the unit.

Successfully used in the field, the transmitter is capable of an accuracy of better than one percent when used with an external calibrator. Used without the calibrator, the transmitter accuracy is approximately two percent.

The new transmitter is used with the existing ground station equipment modified to provide a receiver with the proper r-f frequency range and bandwidth characteristics. This was done by changing the 1025-mc receiver used with the 30-channel system to the extent of providing a 227-mc r-f section and a narrower i-f bandwidth. The evolved receiver had these characteristics: A noise figure of 3 db at 227 mc, i-f bandwidth of 0.5 mc, r-f bandwidth of 15 mc, and a tuning range of 210 to 235 mc. This extremely low noise figure, incidentally, was achieved through the use of two Western Electric 416A triodes as first and second r-f amplifiers. Credit for the development of this circuit, using a tube originally designed for *microwave* use, goes to Robert Lowell of the Rocket Sonde Research Branch.

A word about the antennas used with this telemetering system. For the 30-channel system, the transmitting antenna, mounted in a pressure-tight housing on one of the rocket tail fins, is a turnstile design, used to obtain radiation in all directions. The receiving antenna is an elliptically polarized assembly, using a four-foot paraboloid reflector. It has an 18-degree beamwidth and may be directed either manually or by servo control from an Army optical tracker, modified by the addition of 10-power telescopes. The 15-channel transmitter has been designed to operate into a 50-ohm antenna. In the Aerobee rocket, it has been operated into a notch-excited tail-fin antenna designed and built by the New Mexico College of Agriculture and Mechanic Arts. The ground receiving antenna is a helical beam designed and built by the same agency. It has a beamwidth of approximately 20 degrees and a gain of 10.5 db over a dipole.



Rocket-borne telemetering transmitter weighs 130 pounds, with batteries, and produces 4 kw peak power at 1,025 mc.

As mentioned earlier, one of the objectives of the upper atmosphere research program at NRL is to determine the composition of that region. Electronic circuits have been designed at NRL to help achieve that aim. The equipment used is a radio-frequency mass spectrometer. The spectrometer tube itself is small in size and light in weight—1¼ lb. R-f voltage for the tube is supplied by an oscillator of the modified Pierce type with the frequency controlled by a 3.9-mc crystal. Ion currents—a measure of the chemical element in the gas being sampled—are detected by a d-c feedback amplifier.

In all, four units comprise the spectrometer equipment, which weighs less than 50 lb. and may be installed at the base of the nose cone of the rocket. It is planned to use this equipment for the first time in a forthcoming Viking rocket flight with the hope of determining the composition of atmosphere in the altitude range between 100 and 160 km. In this application, the tube will be swept over a voltage range covering the common atmospheric gases to obtain relative abundances, at a sweep rate of once a second. The data thus obtained will be telemetered back to the ground and recorded using the matrix system.

The new system, however, is not limited to rocket use. Because of the high ion-current yield and ease of rapid scanning, as well as because the tube itself is relatively inexpensive and easy to duplicate, John W. Townsend, Jr., who designed it, believes that the new instrument should be very helpful in the fields of industrial control and medical research where mass spectroscopy has proved a valuable analytical tool.

(To be continued in the January-February 1953 issue.)

15 channels of information are provided by this 18 pound telemetering transmitter, designed for medium-sized rockets.

An open door to

INDUSTRIAL ADVANCEMENT

The U. S. Government has an agency which can help the electronic industries to obtain new products and new processes at nominal cost. This agency is a unit of the Commerce Department called the Office of Technical Services (OTS for short).

Here is what this agency does and how it aids the technical progress of the electronic industries:

A Treasure House of New Products, New Processes

The Federal Government now spends about 1.5 billion dollars annually for scientific research and development. Each research project results in a technical report.

OTS collects the reports on these Government-supported research projects as soon as they are free of security restrictions, and furnishes copies to industry at nominal cost. It already has about 250,000 of these reports and about 600 more are added each month.

These reports usually give full details as to the equipment used, methods used in arriving at the results, and the results attained. The report therefore generally provides a manufacturer with all the information required to set up the process or manufacture the product described in the report. Furthermore, only a very small part of these reports is published in the technical literature.

The OTS collection of technical reports is therefore a stockpile of technical know-how in which manufacturers, both large and small, can find many valuable opportunities to create new products and new processes.

Because a great part of the Government's program of research and development is centered on the electronic and related fields, a large proportion of the research reports collected by OTS are on new materials for the electronics industries, new manufacturing processes, new electronic devices and valuable new applications of electronic equipment to other fields. The electronic industries are therefore particularly well served by this stockpile of technical know-how as a source of "leads" for new products, new processes, and more productive manufacturing techniques.

Publications

To help industry make use of this collection OTS puts out a monthly publication (Bibliography of Technical Reports) which lists the new reports each month and gives an abstract of each (where available). OTS also puts out press releases on those reports which are valuable to a large section of industry. To help users of the Bibliography to find the material of interest in their field without reading the whole Bibliography, a press release is issued for each major industry which tells what reports in the current issue of the Bibliography are of interest to that industry.

To give the business man an overall picture of the new technical advances pouring out of Government research, the OTS also puts out a Newsletter in which the research reports describing new products, new processes, are briefly reviewed in language the non-technical business man can understand.

Reference Services

Many large industrial concerns employ a full-time librarian or even an engineer to review each month's issue of the Bibliography to catch those new research reports that offer opportunities for new products or new processes for that company. Small industrial concerns are not in a posi-

To promote the nation's industrial progress U. S. Department of Commerce thro... of Te...

tion to do that. Hence, OTS provides these facilities whereby small concerns can "locate" the research reports of value to them.

An index (by subject) of all research reports in the OTS collection is compiled every year. A complete set of this index is provided to each commerce department field office. Hence, in each field office a company can check the collection to find reports which provide helpful material for its development program.

Bibliographies. OTS prepares lists of research reports in its collection on particular subjects. (For example: on welding, corrosion protection, fireproofing textiles, etc.). These are for sale at nominal cost. A list of those already prepared is contained in the OTS *List of Formal Bibliographies of PB Reports.* OTS library section will work up research report bibliographies on new subjects on request.

Practical Examples

Here are some practical examples of research reports distributed by OTS which present valuable new product and new process opportunities for the electronic industries.

A) BETTER MATERIALS: Development and Application of Barium Titanate Ceramics as Non-Linear Circuit Elements: Final Report: Treats: Ceramics, Barium titanate-electric properties; Ceramic—Dielectric properties; Barium compounds; Circuits, Electronic -Elements. Code No. of Report: PB 106299.

Contract for Services, Facilities and Materials Required to Investigate and Study Magnetic Ferrites. Problems involved in the development of high Q bodies are discussed. Experiments have been made with the aim of reducing cracks in extruded ferrite bodies. The results show that speed of firing, type and quantity of binder and vapor exhaustion are of prime importance. Several new compositions are discussed. A complete set of hysteresis curves, normal magnetization curves and curves of permeability vs. flux density for all the bodies are included. Code No. of Report: PB 106981.

Effect of Thermal Treatment on the Dielectric Properties of Ceramic Bodies. The development of ferro-electric crystals of $NaTaO_3$, $KTaO_3$, $NaCbO_3$, and $KCbO_3$, in glasses was investigated; these compounds exhibited perovskite structures, dielectric hysteresis loops, and the properties of spontaneous polarization, piezoelectricity, and polymorphic transitions below their Curie points. Code No. of report: PB 105294.

Research on Crystal Detectors of Ionizing Radiation: New Materials for Scintillation Counters and Various Studies and Applications of Scintillation Counters. Two new useful organic materials have been discovered which scintillate under impact of ionizing particles or radiation. Large crystals of these materials have been grown. A gamma ray spectrometer using scintillation counters has been developed which allows partial resolution of the Co^{60} gamma rays. Code No. of report: PB 105554.

Fundamental Research On Raw Materials Used for Electron Emissivity on Indirectly Heated Cathodes: Treats: Cathodes, indirectly heated—emission; Coatings, oxide; Electronmetals—spectrochemical analysis; Electron metals-mechanical properties. Code No. of report: PB 105579.

Welded Germanium Crystals. Treats: Crystals, Germanium; Frequency Changers, Germanium Crystal; Frequency Changers, Microwave; Germanium — Conductivity. Contains also: Welded high voltage units: Electron diffraction pictures of germanium surfaces; I. F. Negative resistance in germanium crystals. Code No. of report: 105586.

B) BETTER MANUFACTURING TECHNIQUES: Study of Automatic Unitized Circuit Techniques, Final Engineering Report. The final report describes and summarizes the development activity aimed at the establishment of a system of electronic circuit- fabrication, which would be automatic or semi-automatic in nature. Such a system was evolved, based on the use of conventional types of electronic components, prefabricated (printed circuit) conductor patterns, and solder-dipping for mass single operation assembly of components to the pattern. Code No. of Report: PB 106942.

Fabrication and Operating Characteristics of Sintered Thoria Cathodes. Sintered thoria cathodes have been prepared by subjecting a mixture of thoria and tungsten or molybdenum powder to 115 tons/sq. inch pressure, and then sintering the resulting compact at 1750 degrees C. for one-half hour. The operating characteristics of two cathode mixtures, one containing 30 percent tungsten and 70 percent thoria and the other 18 percent molybdenum and 82 percent thoria (by weight), were investigated. Code No. of Report: PB 105833.

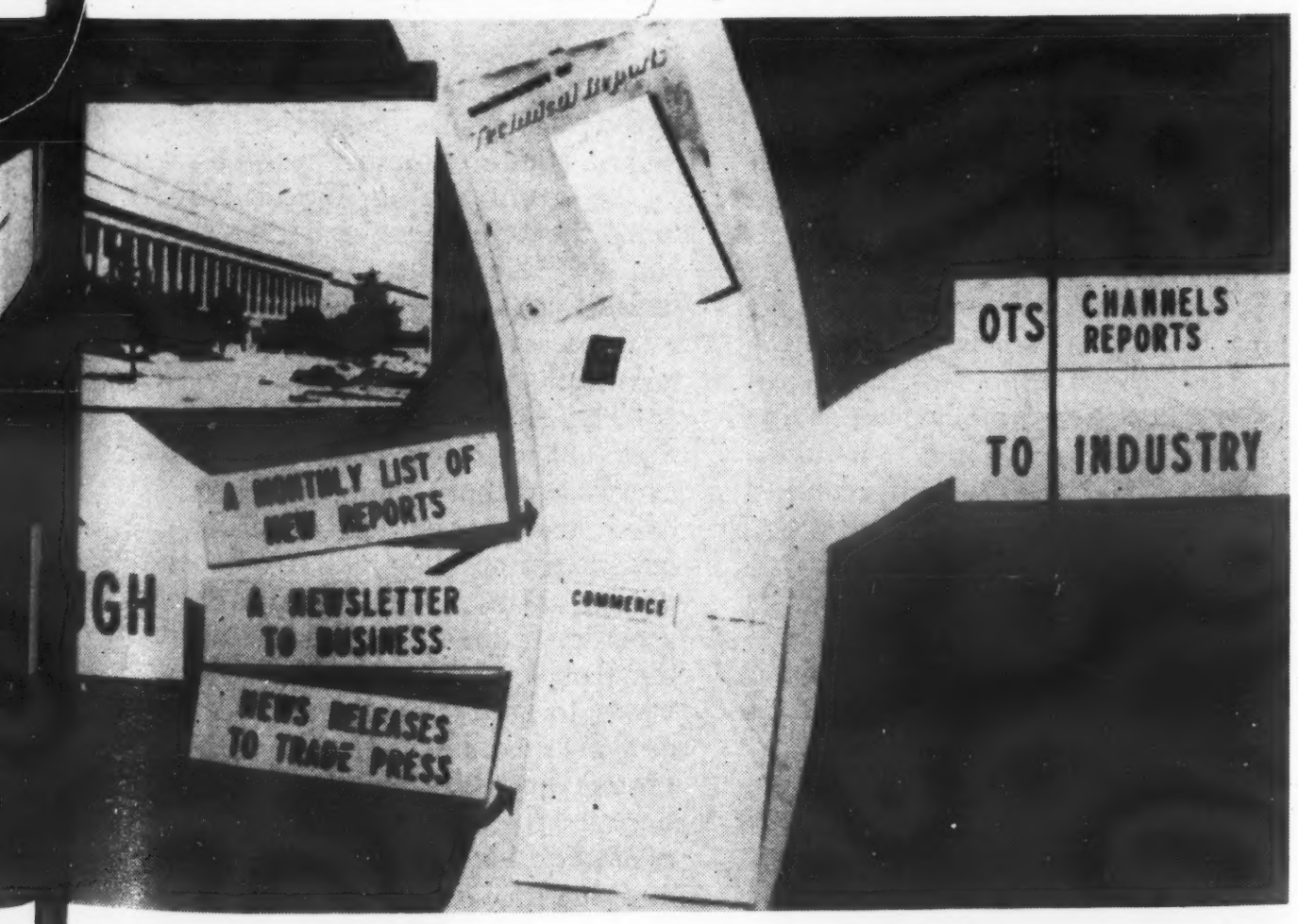
Investigation and Research Pertaining to the Development and Design of Electrolytic Capacities for Low Temperature Operation. This project was part of a broad developmental program directed towards the development of tantalum electrolytic capacitors. Tantalum material in sintered-slug form and foil form used as electrode material for capacitors in conjunction with suitable electrolytes has been thoroughly investigated. Tantalum foil type electrolytic capacitors make it possible to drastically reduce the size of electronic equipment. Code No. of Report: PB 105600.

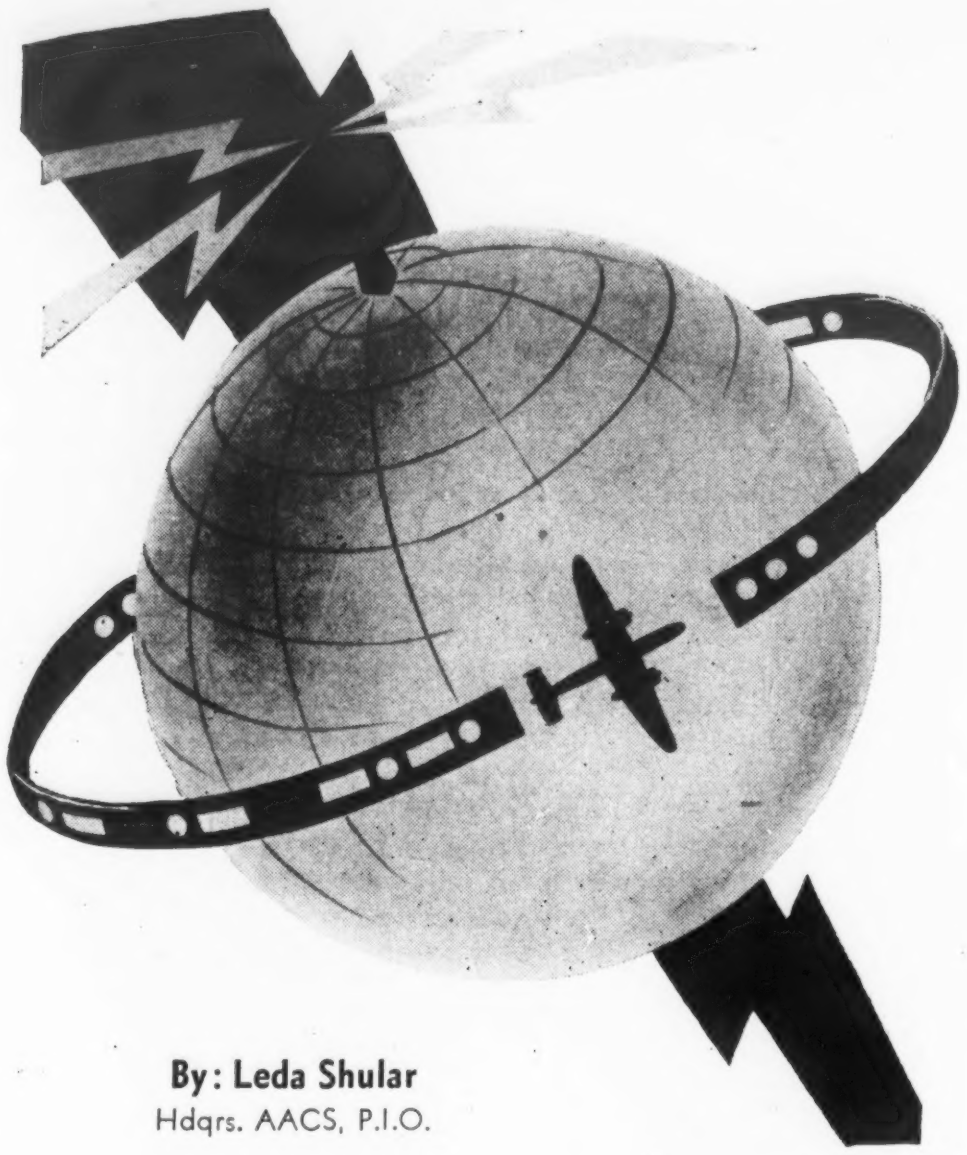
New Instrument for the Rapid Measurement of Capacitor Temperature Coefficients. A radically new type of instrument has been designed to make rapid measurements of the temperature coefficients of capacitance (TC) of small temperature compensating capacitors. In this method, long thremal-stabilization intervals are not required, thus allowing a measurement within only a few minutes. The advantages gained over previously available methods are most apparent in the increased speed of measurement, the reduced cost of the measuring apparatus, and the extreme reduction in equipment size. Code No. of Report PB 105746.

C) NEW APPLICATIONS OF ELECTRONIC EQUIPMENT: Electrical Techniques for Compensation of Therman Time Lag of Thermocouples and Resistance Thermometer Elements:

(*Continued on page 76 col. 2*)

of Technical Services conducts a national clearing house of technical information.





14th AACS *Anniversary*

By: Leda Shular
Hdqrs. AACS, P.I.O.

This year, the 14th anniversary of the Airways and Air Communications Service (AACS) is dedicated to AACSmen in Korea who are providing communications and navigational aids to United Nations aircraft just as other AACSmen are providing the same services at other locations throughout the world.

AACS, the third oldest command in the Air Force, was formed at the insistence of the late General Henry "Hap" Arnold. Officially activated on November 15, 1938 as the Army Airways Communications System, the need for such a system had become apparent much earlier.

In 1934, the Army Air Corps sent ten members to Alaska in a flight which was to prove the importance of long-range bombers as an effective strategic weapon. This flight was led by General Arnold, who was then a major. The lack of an integrated military communications system proved a serious handicap on the flight, and upon their return General Arnold recommended the establishment of a communication system within the Army Air Corps.

This was further emphasized when another flight of B-10s flew a mission from March Field, Calif., to Langley Field, Va., to stimulate loading bombs and to "bomb" For Dix, N. J., in an exercise to prove the striking power of the Air Force. The mission was performed, but due to the lack of good communications, the group made forced landings because of the unexpected bad weather which had not been reported in time to change their course. Many other difficulties were encountered due to poor communications.

It was then that General Arnold established the requirements for air-to-ground and point-to-point stations in order to enable the Air Force to move anywhere and still be in contact with at least one ground station. In order to satisfy his requirements for such a system, four years were required to hammer estimates through various budget agencies, obtain appropriations from Congress and to procure the equipment needed to install the much needed stations in the United States.

Between 1934 and 1936, the ground work for the future AACS was laid by establishing 33 domestic air navigational stations. Within two years these stations had demonstrated their value to a point where in mid-1938 an Army Regulation was published which officially established the Army Airways Communications System.

Thus, AACS was born of necessity and grew from three officers and 300 enlisted men operating the 33 stations to a 51,000-man organization which, during World War II, operated 165,000 miles of global "highways in the sky" from the frigid Arctic to the unbearable heat of the jungles.

In the early part of 1941, as our country drifted closer toward active warfare, there was the need for an expanded military airways communications system. AACS was challenged with the assignment of establishing and operating such a system. New bases were built, and the major problem was finding qualified men to set up and operate these stations. In order to meet this urgency and to fill the requirements, AACS initiated the extensive amateur program which proved to be successful. "Hams" were recruited by word-of-mouth and by a direct mail campaign. The response was terrific. These badly needed radio communications men were assigned to active duty generally to foreign stations and without the usual six weeks' basic training. It was in their off-duty hours that the majority of them learned to "soldier."

AACS stations came on the air one by one, and during World War II more than 30 agencies of the Allied Nations used the communications facilities that it was providing.

Years later, General Arnold in his tribute to AACS stated:

"The AACS has taken the 'aloneness' out of flying, and with it, whatever dread there might otherwise be, of air routes over lonely and dangerous areas, such as vast expanses of ocean, unconquered mountain peaks, relentless deserts. The invisible 'hands of magic' reach out everywhere to guide the pilot on his course and to his destination, weather or terrain notwithstanding. Small wonder the flyer grows to lean on this unseen guide almost as importantly and instinctively as he does on the

In this AACS control tower, the highly skilled and trained operators scan the skies, huq microphones to give landing and take-off instructions to the UN aircraft.

Great Unseen Force. That is how important you are!"

Since its inception, AACS has proven its capabilities in many ways. A good example was shown during the Berlin Airlift when it demonstrated, for the first time, that the weather problem was no barrier. Through fog and smog AACS' Ground Controlled Approach (GCA) operators worked 'round the clock steering aircraft laden with supplies to safe touch-downs. The Airlift presented a marked contrast from the early flying days when aircraft failed in attempts to fly the mail on schedule through bad weather.

As the tempo of flying accelerated, AACS adapted new communications and navigational devices to meet the constantly changing and demanding requirements of today. This is being demonstrated in Korea where AACSmen are providing the United Nations with the latest radar and electronic aids.

Soon after the invasion of Korea, AACS rushed units from the 1808th AACS Wing in Tokyo in order to establish their air navigational and control facilities in the area of South Korea. By mid-July 1950, AACS had airlifted into the theater more than 300 officers and men skilled in the installation, operation and maintenance of mobile communications equipment. Some of these AACSmen were veterans of the Berlin Airlift and their knowledge gained during the Airlift proved invaluable during the early stages in setting up the communications system.

Because of the need for the immediate airways communications to utilize captured airstrips as quickly as possible, AACS men have gained the reputation of being the "first" to land and the "last" to leave. Although non-combat troops, the AACSmen frequently exchange sending keys for machine guns and carbines to defend and secure airfields. They stay to operate their facilities as long as our aircraft are still in the area and in a number of instances have stayed after all other personnel had been evacuated regardless of their own personal safety.

Such an incident happened at a base in Korea shortly after the first AACS team went in to set up their facilities. They remained just long enough for the Ground Controlled Approach (GCA) to make one landing of an aircraft on the field before the GCA equipment had to be removed to avoid capture by the enemy. When the airstrip was ordered to be evacuated, all troops left with the exception of three AACSmen who remained on their own initiative. These AACSmen, Capt. Robert E. Callison, Sgt. John D. Walker and Sgt. Delbert C. Thomas, kept the station operating for 24 hours running a mobile control jeep to land air evacuation planes for the removal of the wounded. All three were commended personally by the commanding general of the Fifth Air Force, Maj. Gen. Earle E. Patridge for their action.

In addition to their normal duties AACSmen in their spare time, performed many humane deeds. They are the instigators of the well known "Fathers-For-A-Day," program where near-by orphanages are contacted for the purpose of entertaining the youngsters at the bases. This program was originated in 1949 at Hamilton Air Force Base, Calif., by two AACS sergeants, T/Sgt. Herbert Hymer and S/Sgt. Harold Craven. Orphans in the U. S. as well as in foreign countries are guests of the AACSmen. They are treated to nourishing meals, view the various AACS facilities, participate in games, receive gifts and in general have a grand time with their "adopted dads" for the day.

More recently in Korea, AACSmen have found time to look after the less fortunate ones by starting a fund for the upkeep of an orphanage. When word got around that the men of the 1818th AACS Group were eager to do something for the homeless waifs, the commanding officer of the Group, Lt. Col. Marion A. Ramsey, gave his approval and the idea was enthusiastically accepted by all. Contributions poured in from AACSmen, including the ones stationed at forward bases who were busy supplying their services to the United Nations. In their off-duty hours, AACSmen repaired the building that became the AACS Orphanage. Voluntary contributions keep the orphanage, which opened its doors this past March, operating and the children are provided with good food, clean clothes, medical supplies and Korean attendants and teachers.

In reviewing the past accomplishments of AACS, it can be stated that this once small organization grew beyond all anticipations, and credit for its successfulness belongs to the thousands of AACS men and women who vigilantly supply the many services to keep the Air Force flying safely.

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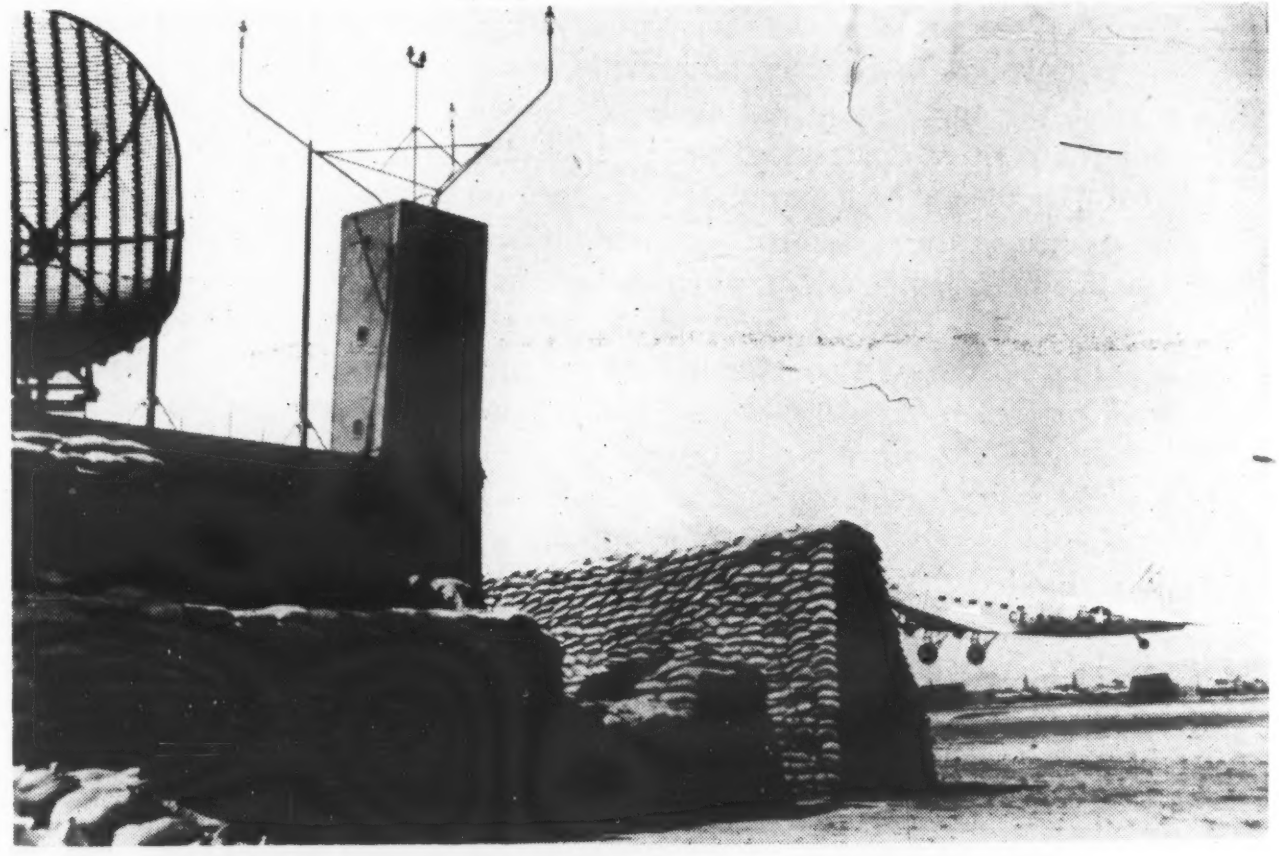
Sandbagged is this Ground Controlled Approach (CGA) radar unit which guides the UN aircraft to safe landings despite the bad weather and poor visibility. In addition this "eye in the sky" is used to detect enemy aircraft making raids below the 38th Parallel. In a one 10 month period, the AACS technicians of this GCA unit successfully guided over 4,000 UN aircraft to safe touch-downs.



From the President

Last month President Watts covered some of Industry's responsibilities towards complete cooperation between civilian business and the Armed Forces. In this letter he explains how the Services can assist Industry in its many complex problems.

In my last message I touched briefly on some of the factors which I felt important for Industry to understand in its dealings with the Armed Forces so that the cooperation between these groups sought by AFCA might be fostered and strengthened both to their mutual advantage and that of the National welfare. I want now to consider briefly the Armed Forces' part in this relationship.

It is the normal peacetime mission of American Industry to produce goods and services which are timely, which will adequately fulfill the purpose for which they are intended, which are priced so as to allow a reasonable profit, and which are useful to the national economy, whether as producer or consumer goods. Violation of any of these four principles is inevitably punished either by competition or, more severely, by commercial failure. If, therefore, Industry is to remain strong and thus be prepared to discharge fully the burden that either mobilization or out-right hostilities entail, it cannot entertain, without serious risk, proposals that violate one or more of these principles.

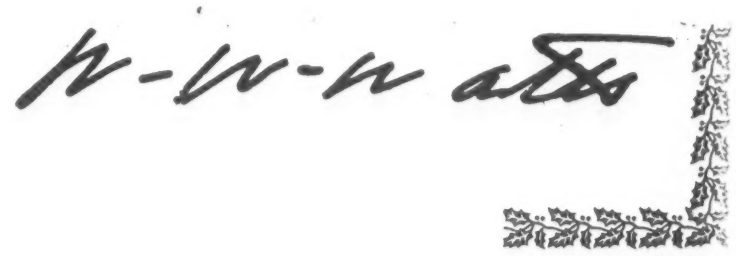
Essentially, Industry is the process of converting an idea into a physical product or service which can actually be sold and used for the purpose intended. In this process of conversion, which runs through all of the intermediate steps between the drafting-room and the sales-room, there are innumerable hazards such as market changes, financing matters, increased costs, and competitive operations, which may affect the successful outcome of a particular product undertaking. To minimize these hazards, Industry has adopted the practice of speeding the productive process as much as possible. It is only by strict adherence to fast schedules that costs result consistent with the predetermined costs on which the original production plan was made. Inherently, therefore, Industry makes every effort to prevent either interruptions in or stretch-outs of the production cycle. If such interruptions are unavoidable, Industry strongly feels first, that they should be planned so as to cause the least disturbance, second, that a reasoned explanation will do much to assist in obtaining acceptance of the situation, and third, that the resulting costs must be taken into account.

Over the span of our history there have been relatively few years in which the major part of industry was required to support either mobilization or out-right hostilities. As a result, Industry's normal habit is to look at its operations through the eyes of peacetime competitive conditions. Additionally, there is the fact that Industry has been relatively free to devote its efforts to those fields which experience has shown to be most favorable and which, over the long pull, will produce consistent profits. When, therefore, proposals are made for specific operations, it is desirable that effort be made to reconcile them with usual industrial practices, thoughts, and habits.

In the course of its development, Industry has built up, beyond the actual productive organizations, other large organizations such as Engineering, Purchasing, Accounting, and similar units which are required to control and facilitate operations of the scope involved. The cost of these organizations, which are frequently composed of large numbers of people having special skills, is high. When individual Military proposals are made, such as those involving subcontracting, wherein the efforts of such organizations are required, due recognition of these considerations should do much to create an atmosphere of confidence in which the problems involved can be satisfactorily worked out. In these areas there is room for greater mutual understanding.

The amount of corerspondence and inquiries that I have recently been receiving about the Association is most encouraging and demonstrates growing interest and enthusiasm and a real determination to make the Association serve well the purpose for which it was founded.

With the approach of Christmas, I want to extend to all members, their families, and associates, hearty greetings for the Holiday Season and my best wishes for the coming year.



National Director of Chapters: Maj. Gen. George I. Back

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WASHINGTON: President—Joseph R. Redman, Western Union, 1405 G St., N.W., Washington, D. C. Secretary—James F. Coll, Western Union, 1405 G St., N.W., Washington, D. C.

STUDENT CHAPTERS

CORNELL UNIVERSITY, Ithaca, N. Y.

NEW YORK UNIVERSITY, New York, N. Y. President—Roger Berry. Secretary—Edward Abelowitz.

OHIO STATE UNIVERSITY, Columbus, O.

OKLAHOMA A & M COLLEGE, Stillwater, Okla.

PURDUE UNIVERSITY: Lafayette, Ind. President—Allen Borken; Secretary—Stanley S. Kershaw, Jr.

STATE COLLEGE OF WASHINGTON, Pullman, Wash.

TEXAS TECHNOLOGICAL COLLEGE, Lubbock, Texas. President—Charles I. Powell. Secretary—Don Mears.

UNIVERSITY OF ALABAMA, University, Ala.

UNIVERSITY OF CALIFORNIA, Berkeley, Calif.

UNIVERSITY OF ILLINOIS: Urbana, Ill.

UNIVERSITY OF VIRGINIA: President—Robert L. Dean; Secretary—Walter S. Moore.

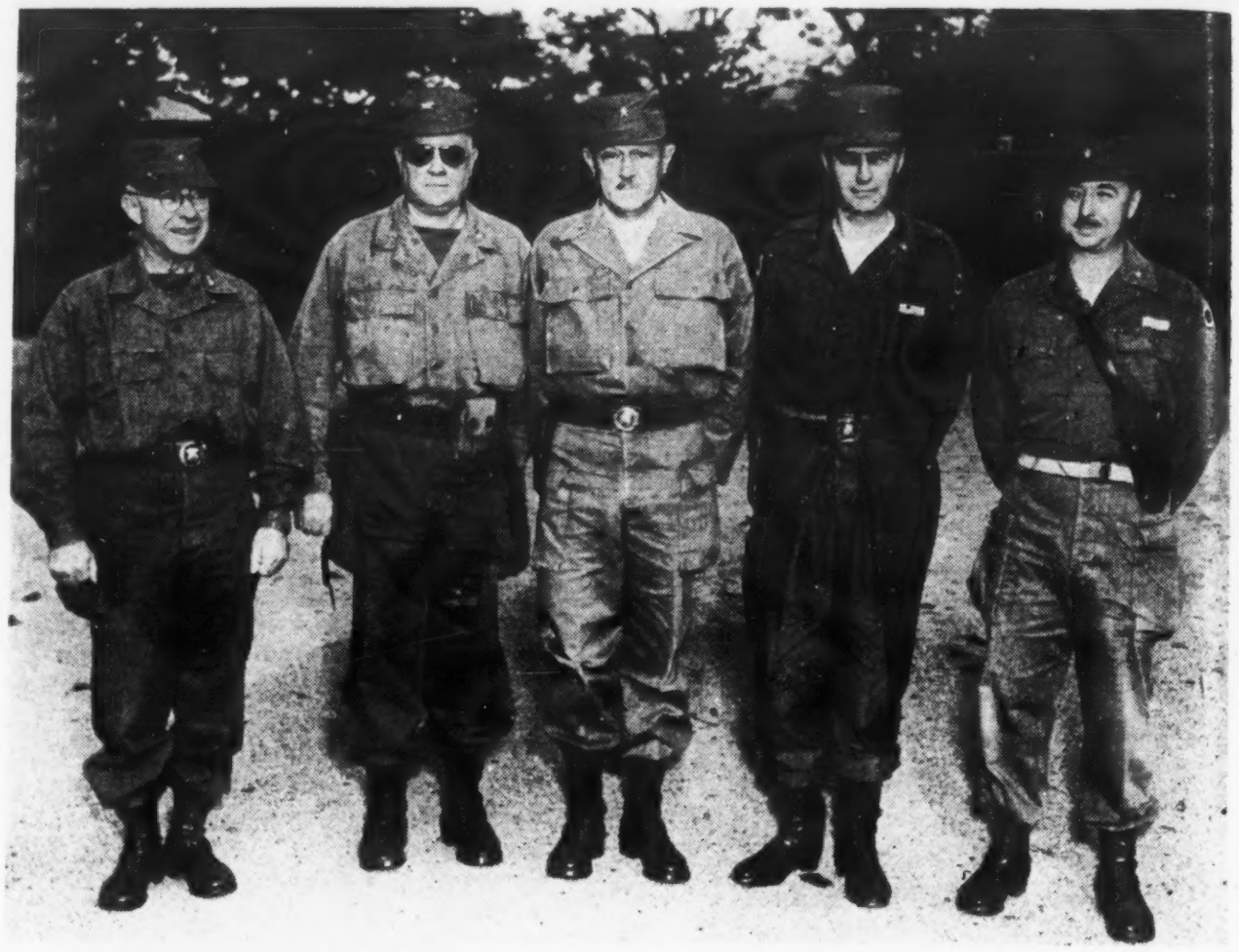
UTAH STATE AGRICULTURAL COLLEGE: Logan, Utah.

National Headquarters Chapters Secretary: Julia B. Godfrey

Association Affairs

National Convention at Dayton

The Dayton-Wright Chapter will be host to the AFCA National Convention next May 14, 15 and 16. As president of this chapter, Paul H. Clark assumes chairmanship of the convention. Headquarters for the meetings will be the Biltmore Hotel in Dayton, and the cooperation of the Wright-Patterson Air Field has been graciously offered for demonstration meetings. Although all details and plans have not been made definite this early, it is hoped that YOU will make a definite appointment with the AFCA Convention May 14, 15 and 16.



The Far East Command and Eighth Army Signal Officers visit I Corps Headquarters in Korea to discuss signal problems. Left to right: Brig. Gen. Elton F. Hammond, Far East Command Signal Officer; Col. Frank G. Trew, Far East Command Deputy Signal Officer; Brig. Gen. John K. Waters, I Corps Chief of Staff, and Col. Burnis M. Kelly, I Corps Signal Officer. (US Army photo by PFC Eugene F. McKenna)

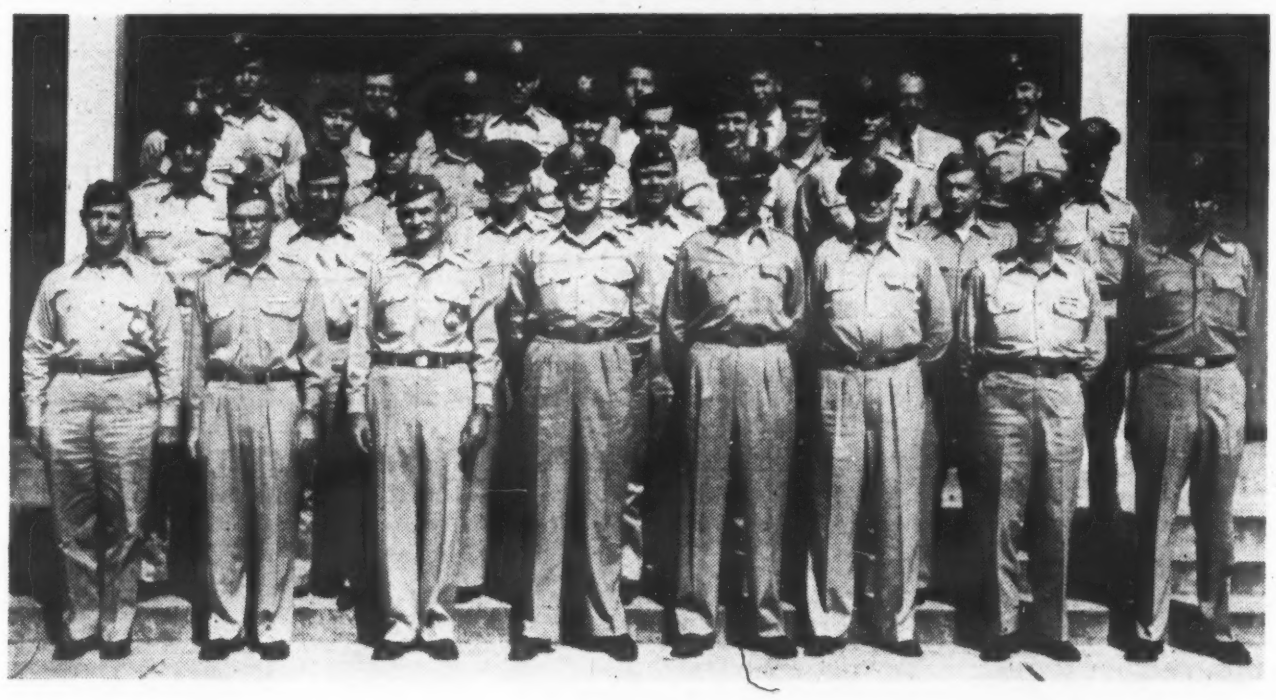
Col. Herrelko Directs C & E Conferences for Eastern Air Defense Force

Believing that an informed communicator is a better communicator, a series of conferences were instituted last year by Colonel Frank E. Herrelko, director, Communications and Electronics at the Eastern Air Defense Force. These conferences are held at the headquarters, Stewart AFB, Newburgh, New York, every three months. C&E officers and civilian advisors of the air division and wing headquarters of the command are invited. Subject matter embraces recent developments in the C&E field, new policies, future planning and other items of interest to bring the conferees up to the minute on current command C&E matters.

The conferences have generated a high degree of enthusiasm from the participants and it is felt that they have accomplished much to improve understanding of mutual problems. The photo, left, shows the group attending the conference held 26-27 August 1952.

Colonel Herrelko, who directs these conferences, is an active member of the New York Chapter and through personal correspondence and contact in the past few months has carried on a private membership drive within the Eastern Air Defense Force area. His efforts have been very successful and, because of his work, the Association has many new members.

Electronics Air Defense Conference of Division and Wing Commanders and Electronic Officers held at Stewart AFB, Newburgh, N. Y., Row 1, left to right: Maj. Levy, Lt. Col. Casey, Lt. Col. Morton, Col. Herrelko, Col. Dunn, Lt. Col. Walker, Maj. Johns, Maj. Patterson. Row 2: Lt. Endres, Capt. Stewart, Capt. Olson, Maj. Stuart, Maj. Iannaccone. Row 3: Capt. Williams, Capt. Pate, Capt. Martin, Maj. Johnston. Row 4: M/Sgt. Palmer, Capt. Gilham, Lt. Musick, Capt. Griffiths, Mr. Denolf, Capt. Wehner. Row 5: Capt. Gothard, Mr. McCrea, Capt. Felknor, Mr. Ryder, Mr. Gull, Mr. Shawl, Capt. Korycansky.



Signal Corps Depot Chiefs Hold Conference

A conference of Commanding Officers of Signal Corps Depots and Signal Supply Officers of General Depots was held October 7 through 9 at the Signal Corps Supply Agency, Philadelphia, to analyze various phases of supply problems.

Brig. Gen. W. Preston Corderman commanding officer of the SCSA, in welcoming the conferees urged that "all cards be put on the table" so that all present might get right down to the core of each problem and come up with a sound solution.

Examination for Radio-Wire-Radar Instructors at Fort Monmouth Announced

The U. S. Civil Service Commission have announced the examination for Instructors for filling positions at the Signal School at Ft. Monmouth. No written test is required for the position. To qualify, applicants must have had progressive practical experience in the repair, testing, and maintenance of mobile, airborne, ground and fixed communications equipment or systems. In addition, for the higher grades, they must have had experience in the instruction of students or workers in pertinent subjects. A year of specialized technical experience in a field appropriate to the position for which application is made is also required for positions paying $5,060 a year. Appropriate education may be substituted for all but the year of specialized technical experience.

Major General K. B. Lawton, Commanding Officer of Ft. Monmouth, says in a letter to SIGNAL regarding these positions, "Most of our recruits are recent university or trade school graduates who are hired at the GS-4 ($3,175) and GS-5 ($3,410) level. They are immediately enrolled in a six months course at this installation which trains the instructor in teaching methods and technical fields. These special training courses have been developed in conjunction with, and approved by, the Civil Service Commission, and assist in qualifying the employee for promotion upon satisfactory completion of the course."

Applications for these positions should be addressed to:

Executive Secretary
Board of U. S. Civil Service Examiners
Headquarters, SigC Center and Ft. Monmouth
Fort Monmouth, New Jersey

AFCA-ROTC Awards Final Report

Virginia Polytechnic Institute

James L. Short, AF—gold medal. Cadet major; industrial engr.; distinguished military student; vice-pres., Omicron Delta Kappa; editor, "Bugle"; Tai Beta Pi Mu; Phi Kappa Phi; Pi Delta Epsilon; Arnold Air Society; Scabbard and Blade; Industr. Engr. Society.

Robert J. Humphrey—silver medal. Cadet cpl.; civil engr.; Am. Society of Civil Engrs.; varsity lacrosse; distinguished military student.

John A. Geikler, Jr.—bronze medal. Physics major; staff radio station WUVT; Physics Club, Rifle Club, Sigma Pi Sigma.

Utah State Agricultural College

George H. Collier, AF—gold medal.
Thurman W. Gardner, AF—silver medal.

Washington State College

Ted S. Block, SigC—gold medal.
Darrel W. Scheffert, SigC—silver medal.
Robert L. Swanson, SigC—bronze medal.

West Virginia University

Alfred F. Ware, SigC—gold medal. Cadet col.; also won U.S. Vet. SigC medal and West Va. ROA award as outstanding ROTC cadet in university.

Jess W. Malcolm, SigC—silver medal. Elecvt. engr. major.

Danilo Orescanin, SigC—bronze medal. Elect. engr. major.

Worcester Polytechnic Institute

David F. Gilbert, SigC—gold medal.
Roger R. Osell, SigC—silver medal.
Brian J. Kelly, SigC—bronze medal.

Awards were also made at the following colleges but the winners had not yet been reported as SIGNAL went to press:

Rensselaer Polytechnic Institute
Rutgers University
University of Alabama
University of California
University of Idaho
University of Illinois
University of Minnesota
University of Pennsylavnia
University of Syracuse
University of Vermont
University of Virginia
Villanova College

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$1.50
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Ideal for Home or Office

Medal-Authorized For Wear On Uniform
(A.R. 600-40-phgs. 68g & 70c)
Bronze: **$3.00** Silver: **$4.00**
Gold: **$5.00**

Lapel Button
For Civilian Dress
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(Prices include tax)

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Can be transferred to glass or any smooth solid surface
4 for **$1.00**

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1624 Eye Street, NW
Washington 6, D. C.

APPLICATION FOR MEMBERSHIP

ARMED FORCES COMMUNICATIONS ASSOCIATION
1624 Eye Street, N. W. Washington 6, D. C.

NAME: ..... (Last Name) (First Name) (Middle Name or Initial)

ADDRESS:
Business: .....
Home: .....

Business Affiliation or Employer: ..... Position .....

Military Service: (if any) Active ☐ — Retired ☐ — Reserve ☐ — A.U.S. ☐
Component: Army ☐ — Navy ☐ — Air Force ☐ — Marines ☐ — Civilian ☐
Coast Guard ☐ — National Guard ☐ — Merchant Marine ☐

Branch: ..... Rank or Grade: .....

Type of Membership desired: Full—$5.00 ☐ Student—$2.00 ☐ Life—$100.00 ☐
I am a citizen of the U.S.A.. Enclosed find $ ..... for annual dues for AFCA membership, which includes subscription to the bi-monthly magazine SIGNAL.

DATE: ..... SIGNATURE: .....

AFCA Group Members

Communications—Electronics—Photography

Listed below are the firms who are group members of the Armed Forces Communications Association. By their membership they indicate their readiness for their share in industry's part in national security. Each firm nominates several of its key employees or officials for individual membership in AFCA, thus forming a group of the highest trained men in the electronics and photographic fields, available for advice and assistance to the armed services on research, development, manufacturing, procurement, and operation.

Acme Telectronix
Admiral Corporation
Allied Radio Corporation
Almo Radio Company
Altec Lansing Corporation
American Cable & Radio Corp.
American Electroneering Corp.
American Institute of Electrical Engineers
American Phenolic Corporation
American Radio Relay League
American Telephone & Telegraph Co.
Anaconda Wire & Cable Company
A. R. F. Products, Inc.
Andrews Corporation
Argus Cameras, Inc.
Arnold Engineering Company
Audio Products Corporation
Automatic Electric Company
Automatic Electric Sales Corp.
Baltimore News Post
Barry Corporation, The
Bell Telephone Company of Pa.
Bendix Radio
Bergsma Brothers
Bliley Electric Company
Breeze Corporation
Burnell & Company
California Water & Telephone Co.
Cambridge Thermionic Corp.
Capitol Radio Engineering Inst., Inc.
Cargo Packers Inc.
Carolina Telephone & Telegraph Co.
Central Radio and Television Schools
Chesapeake & Potomac Tel. Co.
Churchill Cabinet Co.
Cincinnati & Suburban Bell Tel. Co.
Collins Radio Company
Columbus Process Co., Inc.
Copperweld Steel Company
Cornell-Dubilier Electric Corp.
Corning Glass Works
Coyne Electric School, Inc.
Croname, Inc.
Crosley Division-Avco Mfg. Corp.
C. R. Daniels, Inc.
Diamond State Telephone Co.
Drake Manufacturing Co.
Dukane Corporation
DuMont, Allen B., Laboratories, Inc.
Eastman Kodak Company
Electronic Associates, Inc.
Elgin Metalformers Corporation
Espey Manufacturing Co., Inc.
Federal Mfg. and Engineering Corp.
Federal Telephone & Radio Corp.
General Aniline & Film Corp.
General Cable Corporation
General Communications Co.
General Electric Company
General Instrument Corp.
General Insulated Wire Works, Inc.
General Telephone Corp.
General Transformer Co.
Gilfillan Bros., Inc.
Globe Wireless, Ltd.
Graflex, Inc.
Gray Manufacturing Co.
Guardian Electric Mfg. Co.
Hallicrafters Company
Haloid Company
Hammarlund Manufacturing Co., The
Hazeltine Electronics Corp.
Heinemann Electric Company
Hercules Motor Corp.
Hoffman Radio Corp.
Hughes Aircraft Company
Hycon Manufacturing Company
Ilex Optical Co.
Illinois Bell Telephone Co.
Indiana Bell Telephone Co.
Institute of Radio Engineers
Indiana Steel Products Co.
Indiana Steel & Wire Co.
International Business Machines
International Resistance Co.
International Tel. & Tel. Corp.
Jacobsen Manufacturing Co.
James Knights Co., The
Kellogg Switchboard & Supply Co.
Kester Solder Company
Kleinschmidt Laboratories, Inc.
Lavoie Laboratories
Leich Sales Corporation
Lenkurt Electric Company, Inc.
Lenz Electric Manufacturing Co.
Lewyt Corporation
Loral Electronics Corporation
Machlett Laboratories, Inc.
Magnavox Company
Majestic Radio & Television, Inc.
Mallory, P. R., & Co., Inc.
Martin, Glenn L., Company
Merit Transformer Corp.
Michigan Bell Telephone Company
Motorola, Inc.
Mountain States Tel. & Tel. Co.
Muter Company, The
National Cash Register Co.
National Company, Inc.
New England Tel. & Tel. Co.
New Jersey Bell Telephone Company
New York Telephone Company
Northwestern Bell Telephone Co.
Oak Manufacturing Co.
Ohio Bell Telephone Co.
O'Keefe & Merritt Company
Pacific Mercury Television Mfg. Corp.
Pacific Telephone & Telegraph Co.
Philco Corporation
Photographic Society of America
Pickering & Company, Inc.
Pioneer Electric & Research Co., The
Platt Electronics Corporation
Precision Apparatus Co., Inc.
Radiart Corporation
Radio Condenser Company
Radio Corporation of America
RCA Victor Division
Raymond Rosen Engineering Products, Inc.
Ray-O-Vac Company
Raytheon Manufacturing Company
Reeves Instrument Corp.
Remington Rand, Inc.
Saxonburg Potteries
Seeburg, J. B. Corporation
Sherron Electronics Co.
Shoup Engineering Company
Shure Brothers
Simmon Brothers, Inc.
Society of Motion Picture Engineers
Sonotone Corporation
Soundscriber Corp.
Southern Bell Tel. & Tel. Co.
Southern New England Tel. Co.
Southwestern Bell Telephone Co.
Sperry Gyroscope Company
Sprague Electric Company
Stackpole Carbon Company
Standard Coil Products Co., Inc.
Standard Transformer Corp.
Stewart-Warner Corporation
Stromberg-Carlson Co.
Stupakoff Ceramic & Mfg. Co.
Sylvania Electric Products, Inc.
Technicolor Motion Picture Corp.
Telephone Services, Inc.
Telephonics Corporation
Teletype Corporation
Times Facsimile Corporation
Transmitter Equipment Mfg. Co.
Tung-Sol Lamp Works, Inc.
United States Rubber Company
United Telephone Co.
Utah Radio Products Co., Inc.
Voltz Brothers, Inc.
Waterman Products Co., Inc.
Webster-Chicago Corporation
Wells Sales, Inc.
West Coast Telephone Co.
Western Electric Company, Inc.
Western Union Telegraph Co.
Westinghouse Electric Corp.
Weston Electrical Instrument Corp.
Whitney Blake Co.
Wickes Engineering & Construction Co.
Willard Storage Battery Company
Wisconsin Telephone Company
Wollensak Optical Company
York-Hoover Corporation
Zenith Radio Corporation

Longer lasting batteries, plus a unique power saving switch, give this RCA Victor personal radio 10 times the playing life of previous models.

New Personal Radio...plays 10 times longer

About the size of the average book, this new Personal radio—developed through RCA research and engineering—offers new convenience and economy to those who want a light, beautifully streamlined, long-lasting instrument.

Secret of its long life is a new dry cell "B" battery—used in combination with redesigned "A" batteries to create a more lasting power source. Additional life is given by a unique switch, for use in areas where radio reception is strong, which reduces the drain on the batteries, and adds up to 30% to their lives. RCA Victor's new receiver plays *instantly*, without needing to warm up, has an automatic control to keep the sound volume even, and can be had in six rich colors.

Development of this compact radio is another example of RCA research and engineering at work for *you*. RCA research means better quality and performance from any product or service of RCA or RCA Victor.

* * *

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Chapter News

The Memphis Chapter, AFCA's newest unit, was officially chartered on September 18th. L to R are: Ralph Grist, H. W. Slavick, E. C. Frase, chapter president, AFCA Executive Secretary George Dixon who made the presentation, and Roy Freeman.

Atlanta Chapter's October 1st meeting. L to R: Lt. R. C. Mallonnee, Jr., guest speaker; W. H. Mansfield; Col. R. C. Mallonnee, deputy post commander, Fort McPherson; Chapter President P. R. Curry; and Col. S. P. Collins, Signal Officer, Third Army.

Atlanta

The chapter resumed fall activities with a well-attended dinner meeting on October 1st.

Featured on the program was an excellent talk by Lt. R. C. Mallonnee, Jr., on his experiences with communications during a tour of duty in Korea as an artillery officer. In addition, two Army training films were shown on the indoctrination of recruits and the use of some of the latest equipment.

Held at the Fort McPherson officers' club, the meeting and social hour which preceded it was enjoyed by 92 members and guests. Chapter President P. R. Curry presided and introduced the following distinguished guests: Col. R. C. Mallonnee, deputy post commander, Fort McPherson; Col. S. P. Collins, signal officer, Third Army; Maj. K. S. McMichael, Dobbins Air Force Base; and the speaker, Lt. Mallonnee, commanding officer, headquarters company, Third Army.

William A. Strange of Western Electric has been appointed secretary-treasurer of the chapter to succeed Ralph Wooten who was transferred to New York in September.

Augusta-Camp Gordon

An extensive tour of the Criminal Investigation Laboratory of Camp Gordon was the highlight of the chapter's August 15th meeting.

Many of the methods used in crime detection were explained and demonstrated by members of the laboratory staff. Capt. Atherton described the professional examination of documents, showing the manner in which comparisons are made between sample writings, known as exemplars, and the questioned documents. PFC Carter demonstrated the tools used in firearms examinations to determine whether or not bullets or cartridges have been fired from a suspect weapon. The use of infra-red, ultra-violet, photomicrographic, and photomacrographic techniques in the support of laboratory functions were demonstrated by PFC Seil. An orientation on techniques used in identifying narcotics and other questioned substances was conducted by Sgt. Jablon with the aid of X-ray diffraction. PFC Carbarino demonstrated spectrographic analysis in tracing materials to a specific substance or container, such as paint comparison cases in hit-and-run accidents.

Members and guests first met at the Camp Gordon officers' club for a cocktail hour and a Southern fried chicken dinner. Major D. R. Dingeman, officer in charge of the Criminal Investigation Laboratory, briefed the audience on the background and functions of the laboratory prior to the tour.

Brig. Gen. Frank A. Allen, Jr., commanding general, Camp Gordon, was guest speaker at the September 25th meeting. Speaking on Korea where he had served with the famed First Cavalry Division, General Allen traced its history since the days before Genghis and Kublai Khan, and then reviewed the events which developed since the war in the Pacific came to a close in August 1945.

Describing the drive of the North Korean Communists in June 1950 and the resultant "police action" taken by the United Nations, with the employment of the 24th U. S. Army Division

View of the Augusta-Camp Gordon's dinner-meeting on September 25th which had a record attendance. Brig. Gen. Frank A. Allen, Jr., Commanding General, Camp Gordon, was the featured speaker.

then on occupation duty in Japan, General Allen remarked, "It is not within my purview to discuss the political merits of the employment of our ground forces in this military action, nor am I in a position to discuss the legal and political consequences of such action. I do feel as an individual, however, that had we not employed force to oppose the Communist advance, all of Korea would have been lost to Communism and many of our friendly nations now looking to us for guidance and support would have hesitated to remain friends with us, lest the powerful military machine of the Soviet government over-run their respective countries."

General Allen reviewed the Korean campaign which changed from defense to wide open offensive, and touched on the armistice conferences which have been in session for more than a year. In conclusion, he said, "I think it should be of interest to know that the unified command that has operated in Korea—the Army, the Navy and the Air Force—has, almost without exception, proved most successful. The ground soldier has come to depend upon the air for destruction of targets that oppose him, and to destroy the supply depots, etc., beyond the range of his own weapons. The Navy has fired upon the rail and road net along the coast lines which his guns have been able to reach, and denied access of the seas to the enemy. In addition, the Navy air power has delivered telling blows on enemy troop bases and supply lines. Our experiences in Korea do not warrant the belief that any one of our military forces by itself is sufficient to win a war or to stop the advance of an army."

Frank A. Woods of the Southern Bell Telephon & Telegraph Co. discussing microwaves at the October meeting of the Augusta-Camp Gordon Chapter.

The dinner-meeting was held at the Camp Gordon officers' club with a record number of members and guests in attendance.

A lecture-demonstration on the miracle of microwaves was presented at the October 15th meeting by Frank A. Woods of the Southern Bell Telephone and Telegraph Company. Describing microwaves as sound waves not quite three inches long, he explained that in the relaying of telephone or television programs across the country these waves are picked up, amplified and again sent out to the next station 107 times. He pointed out that the microwave system is designed to supplement, not supplant, the coaxial cable network.

During the demonstration, Mr. Woods showed the audience how radio waves can be bent, reflected and shadowed out in the same manner as a beam of light.

A social hour and shrimp dinner preceded the evening's program.

1952 Chapter of the Year
GULF COAST

1953 Chapter of the Year Contest

The contest passed the seven months' mark on October 31st with the following chapters in the lead:

	POINTS
Decatur	19.91
Augusta-Camp Gordon	14.80
Dayton-Wright	11.89
New York	10.57
Pittsburgh	10.40
Boston	10.09
Chicago	9.31
Seattle	8.77
San Francisco	8.21
Philadelphia	8.07

Baltimore

A social get-together at Fort Meade on September 30th launched Baltimore's activities for the fall, with fifty-two members and guests present for the cocktail hour and steak dinner.

Chapter President George Ruehl opened the meeting with a word of appreciation to Col. J. D. Dreyfus, signal officer, Second Army, for making the facilities of the 579th Signal Depot Company available to the chapter for the evening. Chapter officers and committee chairmen were then introduced to the members.

Col. George Dixon, AFCA National Executive Secretary, expressed his pleasure at the progress being made by the chapter so far this year. He also commended President Ruehl for his invaluable assistance as associate editor of SIGNAL.

Two interesting and informative films—one on the ordnance depot at Aberdeen and the other entitled "Face to Face with Communism"—concluded the evening's program.

The recent appointment of a new program chairman, Aaron Wilkes who is in charge of programming for WBAL-TV, completes the chapter's planning organization for the current year.

Boston

A tour of inspection of plants in the Greater Boston area by Maj. Gen. George I. Back, Chief Signal Officer, and Brig. Gen. J. D. O'Connell, Deputy Signal Officer, on September 16th, was climaxed in the evening by a reception held in their honor by the Boston Chapter.

In an informal address before the AFCA gathering at the officers' club of the Charlestown Navy Yard, General Back stressed the importance of close cooperation between the Signal Corps and industry. Industries' suggestions are always welcome, he said, and urged his audience to give him and his staff the benefit of their ideas for improving the relationship between the Signal Corps and its contractors in order to provide the best possible equipment for our fighting men at the lowest cost.

Generall O'Connell described his recent tour of duty in Korea and said that the performance of communications facilities in that area was highly gratifying and an important factor in successful military operations.

Chapter President Paul F. Hannah served as toastmaster. Some fifty members and guests were present.

Predicting that more economical weapons for the armed forces will come from new applications of electronics, W. W. Watts, AFCA National President, in an address before the first regular fall meeting of the chapter on September 25th, paid tribute to New England as a center of electronic research, development and production.

The region, he said, is closely linked

Shown at the Boston Chapter's reception for the Chief Signal Officer on September 16th, L to R: L. S. Dunham, chapter secretary; R. B. Meader, program chairman; Capt. P. D. Gould, Charlestown Navy Yard; General Back; Paul F. Hannah, chapter president; Maj. Gen. R. R. Allen, Commanding General, New England sub-area; Brig. Gen. J. D. O'Connell, Deputy Chief Signal Officer; Col. J. J. McKendry and B. K. Thorogood, chapter vice-presidents.

A portion of the head table at Chicago's September meeting. L to R: Harold Adler, director of engineering, Hallicrafters Co.; Fritz Franke, Hallicrafters; AFCA Executive Secretary George Dixon; Chapter President James H. Kellogg; and William J. Halligan, president of Hallicrafters Co.

with the names of famous men in the field of electrical and electronic accomplishment, including Benjamin Franklin, Samuel F. B. Morse, Amos Dolbert, Elihu Thompson, Arthur Edwin Canalli and Steinmetz. Thomas Edison, he reminded his listeners, invented the stock ticker while in Boston, Lee DeForest attended prep school there and William David Coolidge taught at M.I.T.

Three factors have contributed to New England's importance as an electronics center, President Watts said. The first of these is the pure research that is carried on there. At the M.I.T. radiation laboratory, developments in microwaves have opened new vistas in communications and other aspects of electronics, while at the institution's servo-mechanism laboratory the principles of automatic gun controls are being extended to industrial applications. Developments in flash photography and radar are other fields where great advances are being made in these centers of research.

A second factor in New England's leadership in electronics, Mr. Watts said, is the volume of military research and development which has been centered here and which from 1952 funds reached a total of $43,500,000 and will reach $48,800,000 from 1953 funds.

A third factor is the region's production capacity. In the Boston area alone, there are more than 300 electronic manufacturing and servicing organizations, of which 200 are regularly engaged in this activity in peacetime as well as wartime. Plants engaged in electronic production throughout New England total 466, employ 56,000 people and have an annual output of half a billion dollars. Fifty-four firms are engaged in one or more aspects of the photographic industry (excluding purely sales organizations). Prime contracts placed by the military in New England totaled $160,000,000 for the Navy, $100,000,000 for the Air Force, and $203,000,000 for the Signal Corps from June 1950 to March 1952.

Electronics is a vital force in our national defense, Mr. Watts said, for no action of the foot soldier, the tank or other branches of the service can succeed without the aid of communications and other electronic devices. Bringing the military's needs and accomplishments to the attention of the public should be a prime objective of the AFCA, he concluded.

A total of 170 persons registered for the electronics training course being sponsored by the Decatur Chapter. Shown below is a view of part of the group on registration night. At the extreme right of the second table is Henry Hines, one of the instructors, assisting in the registration.

Chicago

Chicago's "kick-off" meeting for 1952-53 was held at the Hallicrafters Company plant, with Bill Halligan, president of Hallicrafters and last year's AFCA national president, as host to the 200 members and guests.

The evening's program was arranged by Hallicrafters, with Leo Mead, chief engineer in charge of research and color television, discussing the development of printed circuits, and Harold Adler, director of engineering, covering the past, present and future of the radio industry. A special radio teletypewriter demonstration was set up to show how this latest communication medium operates.

In opening the dinner-meeting, Chapter President James Kellogg pointed out that the chapter exemplifies the splendid cooperation between industry and the armed forces. Col. George Dixon, AFCA Executive Secretary, complimented the chapter on the excellent turnout and said that the diversification of members in the Chicago Chapter makes it one of the most dynamic in the association.

Special guests of the chapter were Capt. J. M. Leitweiler, USN, communications officer, 9th Naval District, and Col. T. E. Horn, signal officer, Fifth Army.

Committee chairmen for the current year have been appointed as follows: reception—William C. DeVry; membership—Raymond A. Johnson; student activities—Richard B. Bean; programme—Carrington H. Stone; publicity—C. G. Duncan-Clark; national security—Arthur D. Swanson.

Dayton-Wright

The experiences of a fighter pilot in Korea were vividly portrayed at the chapter's September 25th meeting by Capt. Richard Imig, who had spent two and a half years in Japan, Korea and Okinawa with the Third Attack Group, piloting F-80's and F-84's.

Discussing activities in the Korean theater, from which he had just recently returned, Capt. Imig dwelt particularly on the subject of air superiority as seen through the eyes of a jet fighter pilot. From his point of view, he compared the various types of aircraft, pointing out the advantages of each and citing in each instance specific situations involved. He also explained and demonstrated the "G" suit and helmet which jet pilots wear because of the accelerated high speeds to which they are subjected.

To substantiate his talk, Capt. Imig showed a film on the Air Force at work and, following this, conducted a very educational question-and-answer period.

Chapter Vice-President George Meyer of Westinghouse presided in the absence of President Paul Clark. He stressed the need of concerted effort on the part of each member in the membership drive to enable the chapter to reach its goal of 200 members by the

end of the year. He also announced that an RCA Westland model television 21" AM radio and 3-speed phonograph would be raffled off during the next few weeks for the purpose of raising funds for the 1953 national AFCA convention. Tickets will sell for 50c each and the drawing will be held at the November 20th meeting.

Earlier in the evening, the Hallicrafters film, "The Voice of Victory," was shown to the gathering.

Decatur

At the August 26th meeting, Chapter President Louis Yack, who was attending his last meeting prior to his departure for Okinawa, was presented with a gold lapel button as a token of esteem and appreciation for his services to the chapter. The presentation was made by Col. Frank Schaal, commanding officer of the Decatur Signal Depot.

Herman Tille, chairman of the industrial relations committee, announced that September 2nd would be registration night for the electronics training course being sponsored by the chapter, and emphasized that application and fortitude would be necessary to absorb the material taught in the course.

Gold buttons were also presented by Col. Schaal to Edna Williams and Mildred Miller for recruiting ten new members each, and to Mr. Tille for outstanding service in promoting the electronics course.

Members of the Dayton-Wright Chapter gathering around Capt. Richard Imig, USAF, guest speaker, at the close of the September 25th meeting. L to R: Robert Siff, Armand Paquette, John Wilkinson, Capt. Imig, Elmer Gerlach, Vernon Midgley, Arnold Clard, William Hine, Bill Kessler, Howard Ingle, James Meyer and Bob Myer.

"African Adventure," the color sound movie of the Gatti-Hallicrafter expedition to Africa, was shown at the conclusion of the meeting.

Total registration for the electronics training course was 170, of which 121 are AFCA members. The course being given is the latest issued by the DeForest Training School of Chicago. Classes started on September 16th and are being held every Tuesday and Thursday from 7 to 9 P. M. Instructors are Herman Tille, William Kausch, Leo Sereve, Henry Malone, James Torbett, Henry Hines and James Buck, all capable electronics technicians. The chapter reports that it cannot praise too highly the foresight, cooperation and assistance of Col. Schaal and Lt. Col. Edwin Fritz in establishing this course at the Decatur Signal Depot.

Far East

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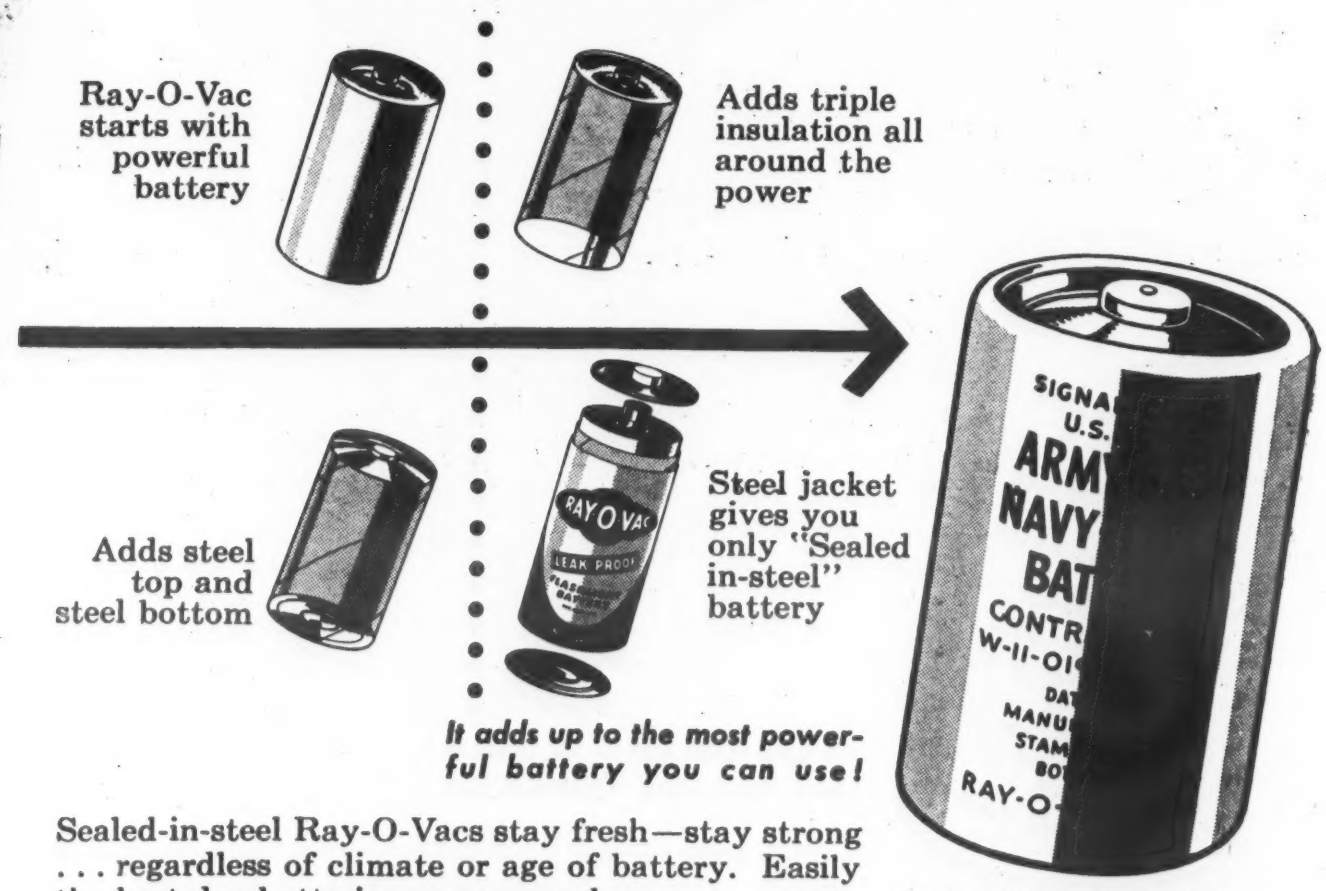

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two interim appointments to replace officers who have been transferred: Col. Wesley E. Calkins, 1808 AACS, succeeds Maj. Thomas Buckley as chairman; and Maj. William A. Kral, 1808 AACS, replaces Lt. Cdr. Rowan L. Scarborough as treasurer.

Col. William A. Beasley, signal officer, Ryukyus Command, and a former president of the Fort Monmouth Chapter, is reactivating the Okinawa Post of the Far East Chapter. A membership drive is now being conducted among the sizable group of potential members from the Signal Corps, Air Force, Navy and State Department in that area.

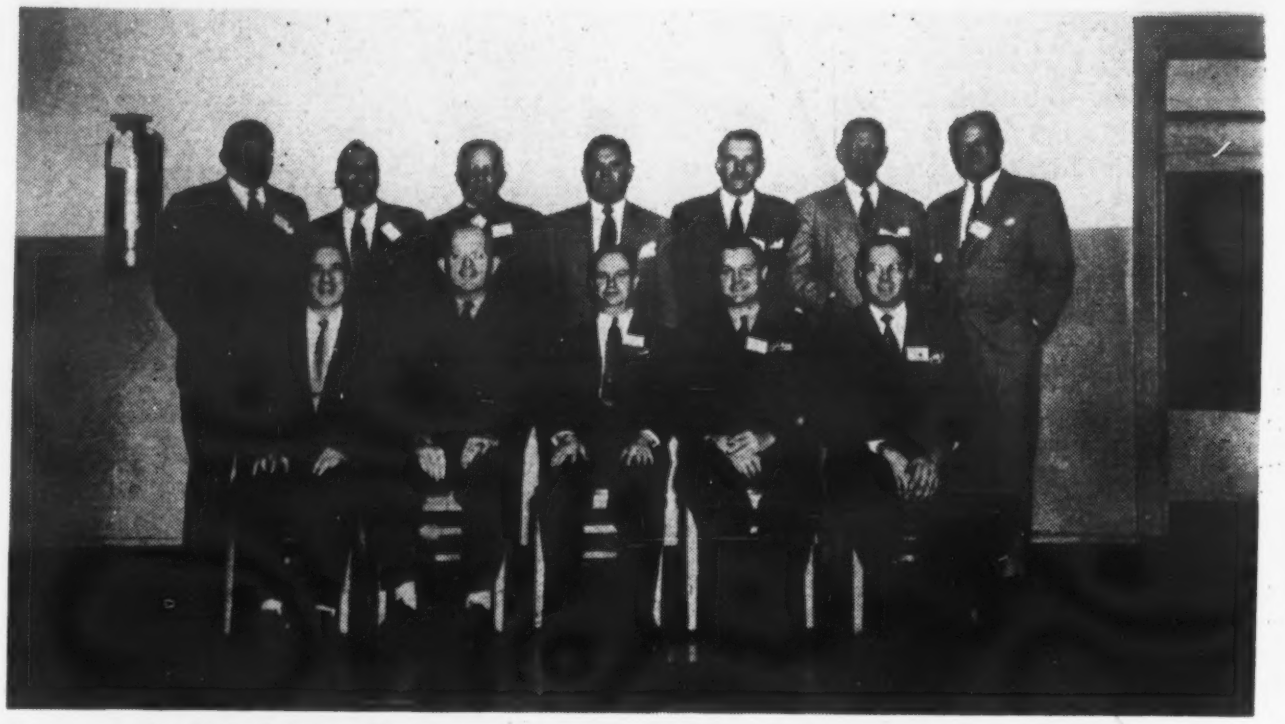
Kansas City

Fall activities resumed with a dinner-meeting on September 15th which featured Col. Carroll S. Miller, director of communications and electronics, Central Air Defense Force, as guest speaker.

With "Communications of an Air Defense Force" as his subject, Col. Miller dealt mainly with the "talking' requirements—telling lines, command lines, etc.—which are needed by the Air Defense Force. He spoke of the necessity for alternate routings, rapid current restoration procedures and the desirability of radio back-up for land line service. He emphasized the responsibility of the Bell System in this connection.

The Bell System film, "Communications for Civil Defense," showing the plans the telephone company is making to insure uninterrupted service in the event of air attack, was presented at the conclusion of Col. Miller's talk.

Some forty members and guests attended the meeting in the Aztec Room of the Hotel President. Brig. Gen. Charles O. Thrasher, director of civil defense, Kansas City, was a special guest of the chapter.



Shown at the Philadelphia Chapter meeting on October 14th: Seated, L to R: Victor Cohen, Brig. Gen. W. P. Corderman, Chapter President Robert G. Swift, Lt. Col. D. L. Rundquist, R. E. Cramer, Jr.; Standing, L to R: J P. Scurlock, J. M. Searing, A. S. Hawthorne, J. P. Barkow, AFCA National President W. W. Watts, Col. George Dixon, Harry Ehle.

Kentucky

The Reverend Perry Cox, rector of St. Peter's Episcopal Church, Paris, Ky., and chairman of the Bourbon County Red Cross Chapter, addressed the October 8th luncheon meeting on "People Helping People," stressing particularly the Red Cross blood program. He announced that the Louisville bloodmobile would be at the Lexington Signal Depot on October 15th and 16th, which would be its third visit this year. At the bloodmobile's last visit, 488 pints of blood had been donated by depot employees.

Lt. Col. Harlan W. Hendrick presided over the meeting in the absence of Col. Harold T. Gallagher, chapter president. Mrs. Hendrick, Red Cross volunteer field consultant for Central and Southeastern Kentucky, was a guest of the chapter at the luncheon. Attendance was 112 members and guests.

Philadelphia Chapter members attending the October meeting at the Signal Corps procurement Agency which featured "Photographic Problems in Korea."

Memphis

With the presentation of its charter by Col. George Dixon, AFCA Executive Secretary, on September 18th, the Memphis Chapter was officially added to the list of active AFCA units.

Mr. Henry Slavick, general manager of WMC, WMCF and WMCT, presided as temporary president and predicted that the chapter would grow to some 300 members within a couple of years. Ralph Grist of Atlanta, general coordinator of military services for Southern Bell Telephone, and Roy Freeman, district manager of Southern Bell in Memphis, who were instrumental in organizing the chapter, also addressed the meeting.

Chapter officers were elected as follows: president—E. C. Frase, Jr., chief engineer, WMC, WMCF and WMCT; 1st vice-president—Roy Freeman; 2nd vice-president—Walter Newborn, president of Memphis Amateur Radio Association; secretary—J. H. Viser, Jr., vice president of Bluff City Distributing Co.; treasurer—Irby Boyd of Boyd Electronics Supply Co.

New York

At a business meeting on September 9th, Chapter President Ted Bartlett submitted the program schedule for the remainder of 1952 as follows: October 29th—Maj. Gen. George I. Back, Chief Signal Officer, as guest speaker; November 17th—FCC Commissioner Bartley, guest speaker; December 17th—combined industry and chapter meeting and annual election of officers.

Vice Adm. W. S. Anderson, first vice-president of the chapter, was designated to act as president during the balance of the year in the event of the possible absence of President Bartlett.

The membership committee chairman Don McClure, reported that mem-

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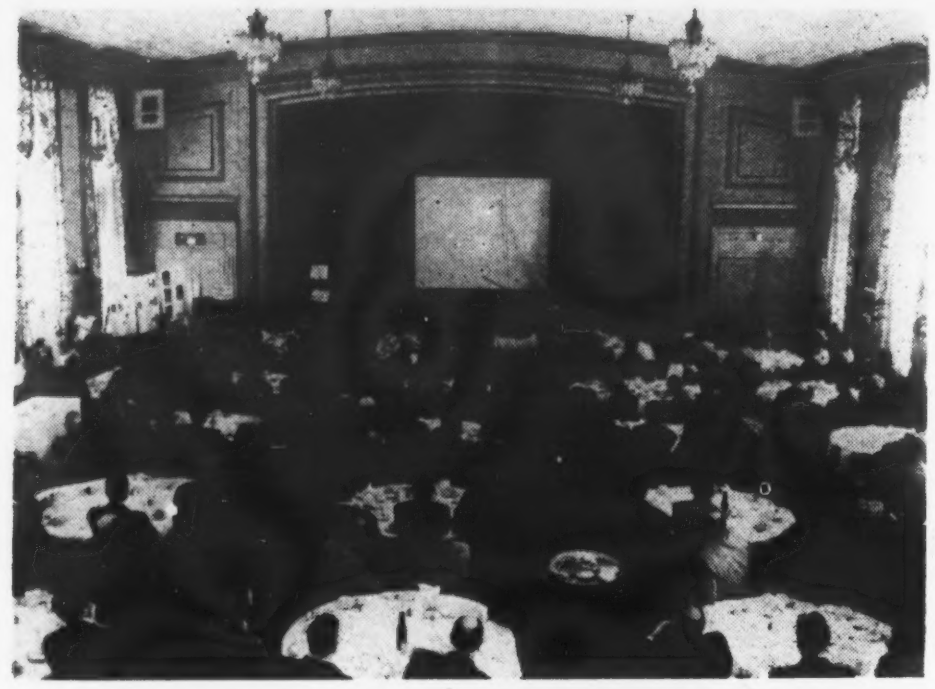


The Washington Chapter's first fall meeting on October 15th featured the Army Pictorial Service of the Signal Corps. Above, left, is part of the photographic exhibit showing the new land type spotting camera and electrophotography, the electrographic camera and equipment. In the photo at right the AFCA audience is watching a Signal Corps training film.

bership had reached an all-time high of 817 on August 31st.

Philadelphia

A very successful dinner-meeting at the Signal Corps Procurement Agency, with Brig. Gen. W. Preston Corderman, commanding officer, acting as host, launched the chapter's activities for 1952-53.

Speaker of the evening was Major Angus L. Walker, chief of the procurement planning branch of the agency, who served as chief photographic officer in the Far East Command for over three years and was awarded the Legion of Merit Medal for his outstanding work in Korea.

Discussing "Photographic Problems in Korea," Major Walker dealt with the problems and practices of the combat photographer and pointed out the heavy casualties resulting from the hazards in this branch of service. To illustrate his talk, he showed a new film on "The Combat Photographer" and demonstrated several models of equipment used in combat by air and ground forces. Shown in the film was the Armed Forces photographic service's method of transmitting photographs from the Far East to the United States in seven minutes.

National AFCA President W. W. Watts and Executive Secretary George Dixon also addressed the group and welcomed the chapter's new officers. A social hour and buffet dinner preceded the meeting.

Committee chairmen have been appointed for the year as follows: civil defense, Philadelphia—Adm. J. Bowling, Philco Corp.; civil defense, Camden—T. A. Smith, RCA; membership—J. P. Barkow, RCA; program—A. S. Hawthorn, RCA; publicity, Norma Testardi, International Resistance Co.

Pittsburgh

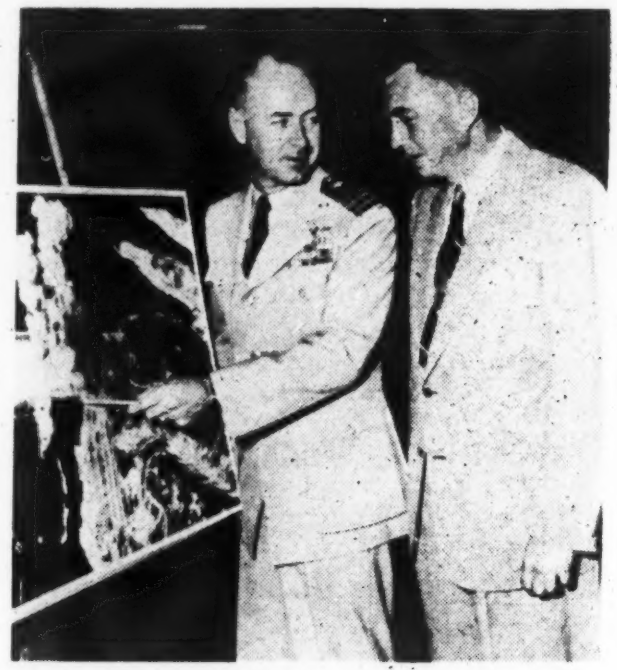
Hamburg Brothers, RCA distributors in the Pittsburgh area, were hosts to the chapter at its August 27th meeting which inaugurated fall activities.

Mr. Frank P. Cummings, program director of WJAC-TV, Johnstown, Pa., was the principal speaker of the evening. The program also featured a film, "Telegram for America," furnished by Western Union.

Mr. S. E. Phillips, general commercial manager of the Bell Telephone Co., had a brief message for the chapter, and Col. V. P. Lupinacci, commanding officer of the AAA, Pennsylvania National Guard in the Pittsburgh area, stressed the importance of having the proper defense for the Pittsburgh industrial area.

Rochester

Faster cameras and faster planes make air reconnaissance far more effective than at the beginning of the Korean action, reported Capt. A. Donald Fraser, head of naval photography, Office of the Chief of Naval Operations, at the first fall meeting of the chapter on September 18th.



At the Rochester Chapter's September meeting, Capt. A. Donald Fraser, Navy photography head, shows detail obtained with a high-speed camera to Chapter President John Whittle.

Capt. Fraser explained the varied developments that have contributed to this progress, and revealed that the Navy is experimenting with the idea of miniaturizing cameras and equipment because space is at a premium both in reconnaissance planes and aboard carriers. He emphasized that quality must be much higher to be effective in this development but expressed high hopes of its success. One such camera has been completed, he said, but it has not yet been used in action. A lot of experimentation is going on, he added,

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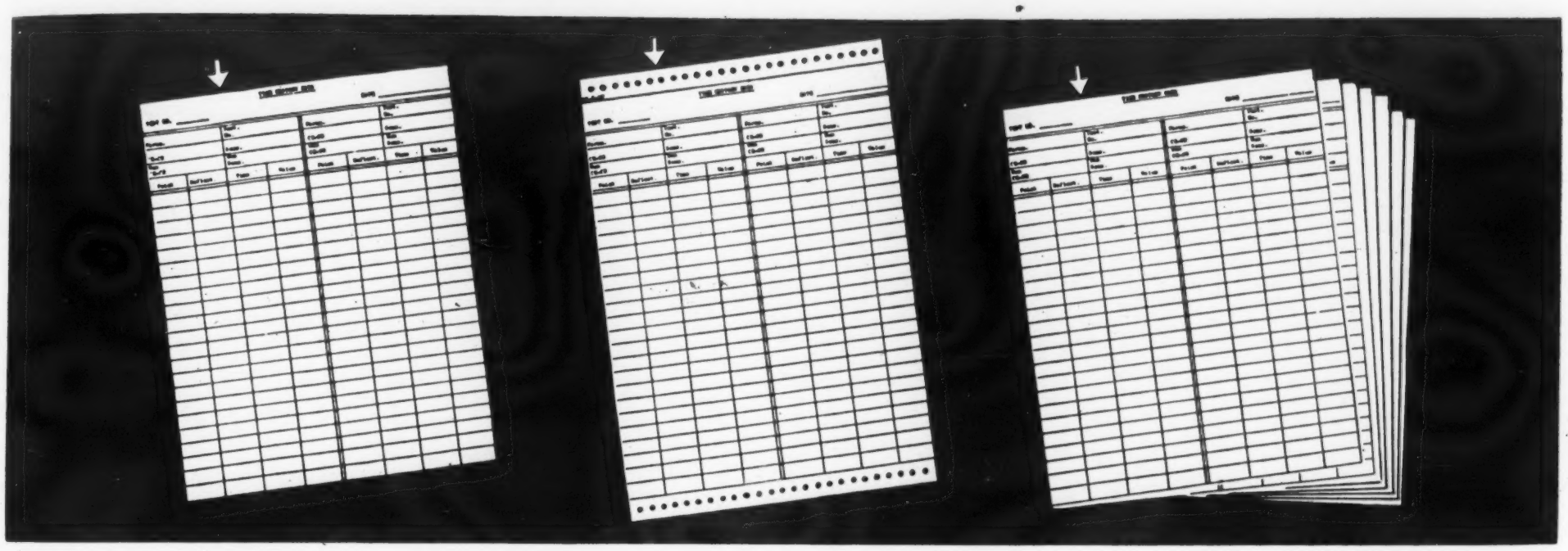

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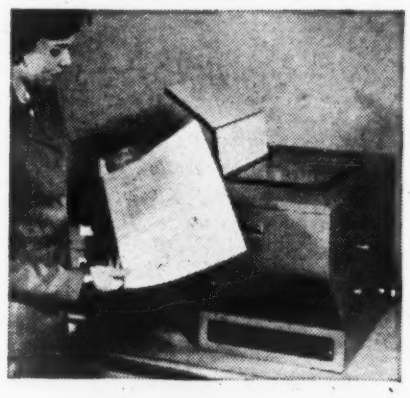

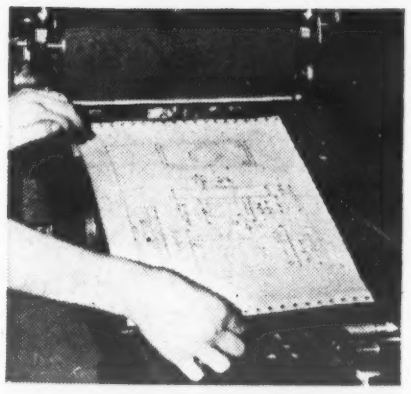

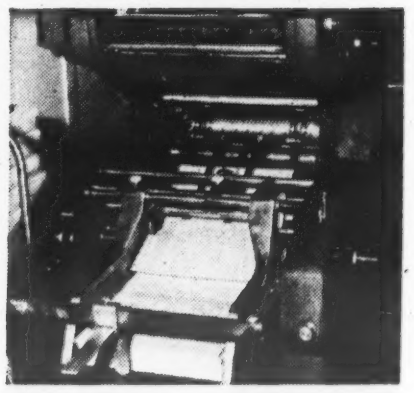

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toward stabilized mounts and automatic exposure control.

The speaker emphasized that air photographic equipment was at a low ebb when the Korean action broke out and rapid progress had to be made to meet needs of the fighting forces, especially in speedier planes, film and shutters, faster facilities for developing pictures and skilled interpreters of analysis and mapping shots.

The luncheon meeting was held in the Chamber of Commerce. Chapter President John A. Whittle of Eastman Kodak presided. The record attendance included representatives of Stromberg-Carlson Company, the chapter's newest group member.

San Francisco

Meeting at Hamilton Air Force Base on September 22nd, the chapter visited the filter center operated by the 28th Air Defense Division and then inspected a number of different types of jet planes, which included the twin jet F-94 (Scorpion).

The members learned how reports received from radar operators at the center were evaluated and shown on the board and what procedures would be followed if incoming planes remained unidentified. After being told how quickly jet interceptors could be airborne, an actual demonstration was staged for the group. A warning signal was sounded and the members saw how a jet was "scrambled," from the moment the pilot and radar man were strapped in to the final takeoff.

Arrangements for the visit were made by Col. Hobart R. Yeager, Western Air Defense Force, who welcomed the chapter to the base and outlined its activities which are divided among the 4th Air Force, Western Air Defense Command and the 28th Air Division. Dinner was served in the Officers Mess and was followed by a short business meeting. Sixty-two members and guests were present.

Scott-St. Louis

After a three-month recess during the summer, the chapter resumed activities at a meeting on September 12th which featured an excellent program arranged by Clifford Wassal, defense activities engineer of the Southwestern Bell Telephone Company.

The first item was a demonstration, "Microwaves and Your Telephone," presented by Irving Mattick, public relations supervisor for Southwestern Bell, and Morton Cummings, demonstrations engineer, which emphasized the technical details of microwave equipment, such as wave-guides, reflection of microwaves and the effects of microwaves passing through various substances. The second feature was an exclusive premiere showing of a new film, "Civil Defense and Your Telephone," which vividly demonstrates the importance of telephone and other communications facilities, including amateur and taxi radio, in case of an enemy bombing attack. The film depicts an actual bombing raid and explains the measures that must be taken to maintain communications facilities.

A buffet dinner preceded the meeting at the Elks Club in Belleville, Ill. Among the 95 members and guests present were the following other personnel of Southwestern Bell Telephone Co.: Douglass G. Williams, vice-president; J. H. Smith, commercial manager; John J. Dugan, service and sales manager; W. O. Douglass, division sales engineer; O. D. Meyer, East St. Louis district manager; H. A. Burke, manager, Belleville; B. R. Robards, equipment chief, East St. Louis; and B. J. Otten, camp telephone manager, Scott AFB.

Keith A. Regel, manager, industrial sales, Automatic Electric Sales Corporation, gave an illustrated talk on "Adventures in Remote Control" at the October 10th meeting, in which he described how telephone-type relays and switches are used for remote control. With the use of colored slides, he depicted the progress in this field from the early days of the first automatic telephone system—itself the most outstanding application of remote control in all industrial history—to such modern developments as racetrack totalizators, pushbutton telegraphy, radio broadcasting and aviation, etc.

Col. William Snouffer, chapter president, announced his transfer to the Far East and tendered his resignation as president. A testimonial signed by some 120 chapter members was presented to him in appreciation of his outstanding leadership in guiding the chapter during its first year of existence. Michael A. Ebinger, first vice-president, will succeed to the presidency until the annual elections in January.

A chapter constitution and a set of by-laws were formally adopted during the business meeting. Seventy members and guests attended the dinner, which is always optional, and a total of 105 were present for the meeting and the program.

Seattle

A total of 161 persons, which included chapter members and their families and guests, enjoyed an all-day trip to the Navy's Jim Creek radio station at Arlington on September 21st. Upon arrival at the station site, the group was divided into three parties for the comprehensive conducted tour of the installation.

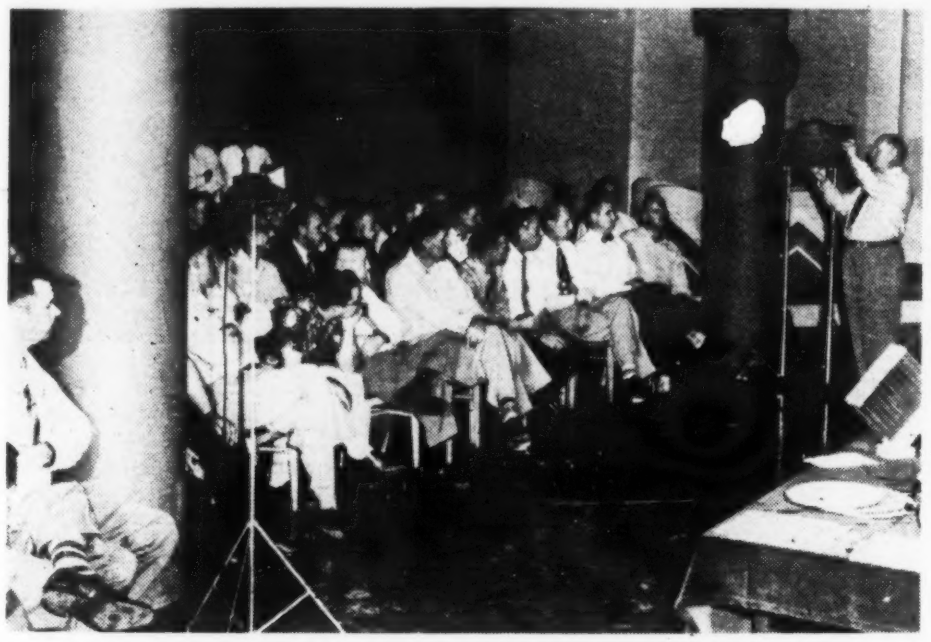
An excellent dinner was served to the chapter members and guests in the station mess hall.

Arrangements for the very successful event were made by Cmdr. Lester M. Hill, commanding officer, U. S. Naval communications station, 13th Naval District, and Lt. Cmdr. R. J. Shea, who is in charge of the Jim Creek station.

Washington

Featuring the Army Pictorial Service at its opening meeting on October 15th, with Col. C. S. Stodter, chief of the service, as guest speaker, the Washington Chapter launched what promises to be an outstanding year of interest and activity for members in the nation's capital.

With the aid of slides, Col. Stodter



The Southwestern Bell Telephone Co. furnished the program for the September 12th meeting of the Scott-St. Louis Chapter. Above, left, members witness a demonstration of microwaves; and, right, Irving Mattick and Morton Cummings of the telephone company discuss some of the equipment with Lt. David Zink, winner of the AFCA gold medal at the University of Texas last spring, who is now stationed at Scott AFB.

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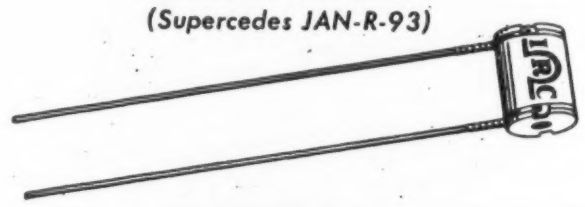
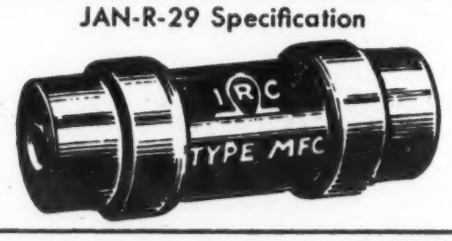
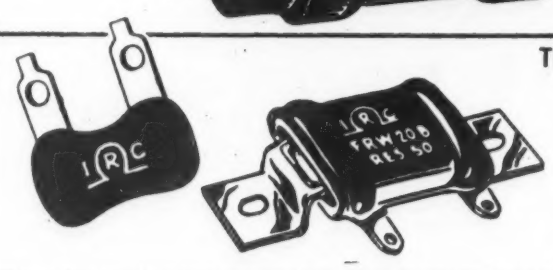
TYPE BW INSULATED WIRE WOUND RESISTORS ½ and 1 watt inexpensive wire wound resistors for low range requirements. Small and completely insulated. Wire resistance element is uniformly and tightly wound on an insulated core.	JAN-R-184 *(Characteristic B)*
NEW TYPE BOC BORON-CARBON PRECISTOR ½ watt. Latest development in stable film-type resistors. Combines high accuracy and long-time stability. Reduces temperature coefficient of conventional deposited carbon resistors. Replaces high value wire wounds at substantial savings in cost and space. Essential in critical electronic and avionic circuits.	MIL-R-10509A Specification
TYPE DCC DEPOSITED CARBON PRECISTOR ½, 1 and 2 watts. Latest advance in small-size, high stability resistors. Ultimate in non-wire-wound accuracy. Stable over long periods. Assures low voltage coefficient, low capacitive and inductive reactance in high frequency uses. Efficient and economical in modern electrical and electronic-circuits.	MIL-R-10509A Specification *plus latest JAN Specification Proposal*
TYPE WW PRECISION WIRE WOUND RESISTORS Severe cycling and 100 hour load tests result in almost no resistance change. New winding forms hold more wire for higher resistance. New winding technique eliminates shorted turns. New type insulation withstands humidity. New terminations are rugged, strain-free.	MIL-R-93A Specification *(Supercedes JAN-R-93)* 
TYPE MF SEALED PRECISION VOLTMETER MULTIPLIERS Completely impervious to humidity. Interconnected precision wound coils are encased in glazed ceramic tube—hermetically sealed. Multiple-layer windings insure resistor against breakdown. Compact, rugged, stable, easy to install.	JAN-R-29 Specification 
POWER WIRE WOUND RESISTORS For exacting, heavy-duty applications. Exceptional mechanical strength; withstand severe vibration. Available in two coatings; a variety of ratings, sizes and terminals; fixed and adjustable types; tubular or flat.	 TUBULAR PWW'S —JAN-R-26A *(G and J Characteristics)* FLAT FRW'S— Correspond to JAN-RW Types

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Assurance is required that relocation of the applicant will not cause disruption of an urgent military project.

CHAPTER NEWS

traced the origin of military photography to the beginning of the Civil War when Mathew Brady, a New York photographer, obtained permission from President Lincoln to photograph battle scenes which were recorded for posterity. With the formation of the first Signal Corps photographic units during the Spanish American War, the growth and development of military photography in the Army has been an integral part of the Signal Corps.

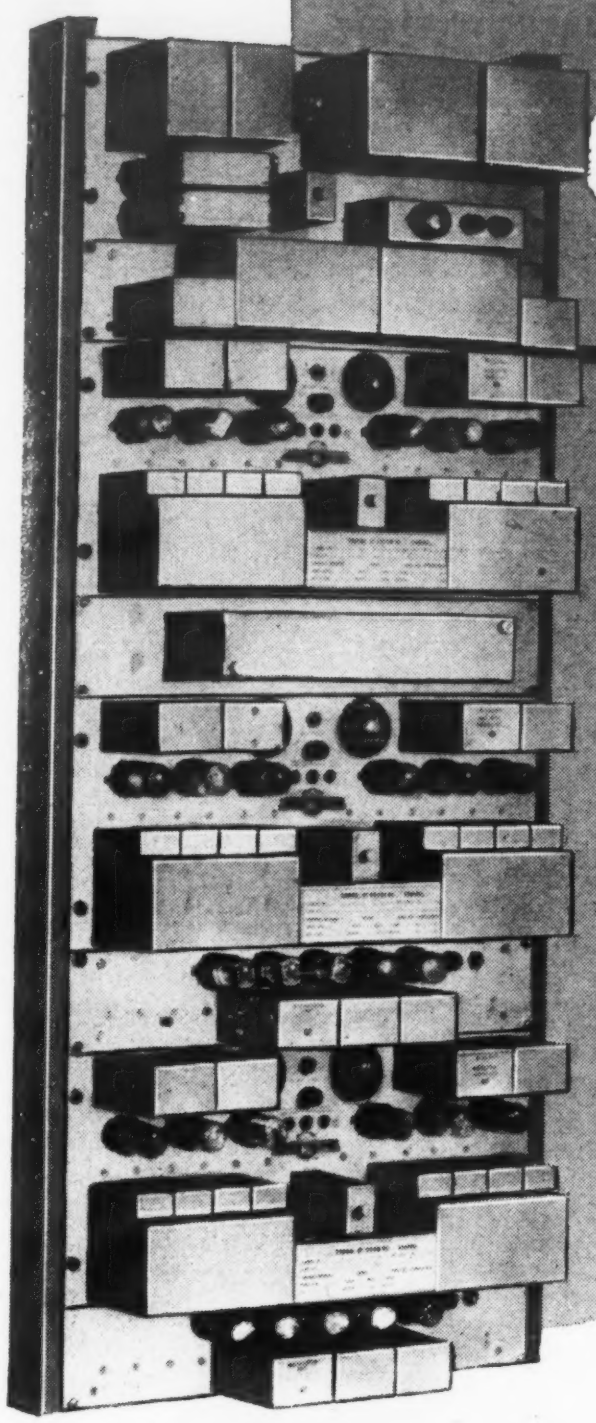
From the early still pictures to the military possibilities of television, the audience was given a vivid portrayal of the progress made in Signal Corps photography during the past ninety years.

"During World War II," Col. Stodter said, "millions of feet of motion picture film and countless still pictures had been exposed. Thousands of training films had been produced and a global distribution system had been established to carry films, projectors, and a film utilization service to our troops everywhere. With the sudden impact of the Korean conflict in 1950 we counted ourselves fortunate indeed that we had available from World War II a solid framework upon which we could rely in meeting this crisis. In the Far East Command we were especially fortunate in having an outstanding pictorial organization available to meet the need of those first critical days. Our cameramen have covered every action starting with the first withdrawal of South Koreans under the initial impact of the Red forces . . . and, as fighting has continued across Korea, the flow of pictorial communications has been continuing, prompt, accurate and complete."

"After our experience of World War II we had placed in our division signal companies a photographic section of one officer and fifteen enlisted men. The purpose of this was to give the division commander a unit which was available to serve his immediate photographic requirements, particularly to furnish tactical support photography. It has been these units which have been carrying one of the heaviest photo loads of the war and which have been exploiting tactical uses of photography."

Commenting on the cooperation between the services, Col. Stodter said it seems greater the closer one approaches the front lines. "Our cameramen have flown with the Air Force, sailed with the Navy, dropped behind enemy lines with the paratroopers, fought into Seoul with the Marines, and have endured every hardship of the ground troops. They have worked, not only with our own troops, but with all the other UN forces in Korea."

In conclusion, Col. Stodter stated that the variety and extent of military requirements for photographic coverage seem endless—pictures for technical evaluation, for training, for identification, for news and public relations purposes, and to document military



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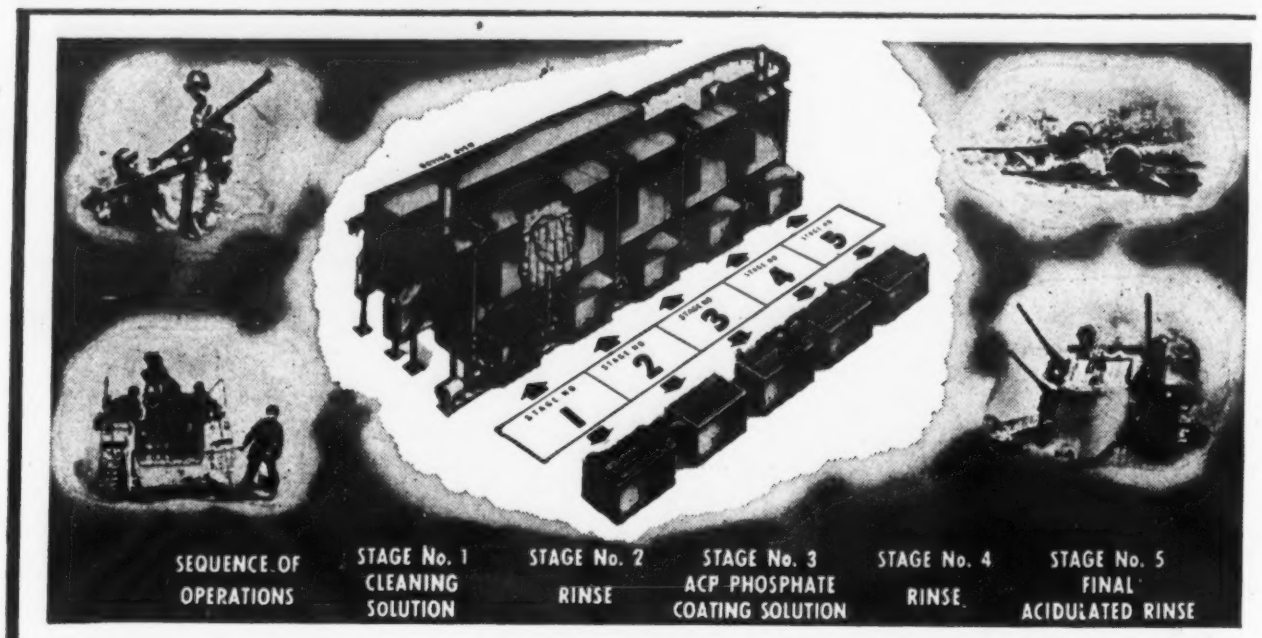
AMBLER CHEMICALS ACP PROCESSES PENNA.

Technical Service Data Sheet
Subject: METAL PRESERVATION AND PAINT PROTECTION WITH ACP PHOSPHATE COATING CHEMICALS


SEQUENCE OF OPERATIONS
STAGE No. 1 CLEANING SOLUTION
STAGE No. 2 RINSE
STAGE No. 3 ACP PHOSPHATE COATING SOLUTION
STAGE No. 4 RINSE
STAGE No. 5 FINAL ACIDULATED RINSE

U.S. ARMY PHOTOGRAPHS COURTESY OF "ORDNANCE MAGAZINE"

Typical spray and dip phosphating equipment and some ordnance products that are now given a protective phosphate coating for extra durability under all kinds of severe exposure conditions. Both military and civilian applications of ACP phosphate coating chemicals are shown in the chart below.

SELECTION CHART OF ACP PROTECTIVE COATING CHEMICALS FOR STEEL, ZINC, AND ALUMINUM

METAL	ACP CHEMICAL	OBJECT OF COATING	TYPICAL METAL PRODUCTS TREATED	GOVERNMENT SPECIFICATIONS
STEEL	"GRANODINE" Zinc Phosphate Coating Chemical	Improved paint adhesion	Steel, iron, or zinc fabricated units or components, automobile bodies, refrigerators, washing machines, cabinets, etc.; projectiles, rockets, bombs, rifles, small arms, belt links, cartridge tanks, vehicular sheet metal, tank bolts and links, recoilless guns, etc.	MIL-S-5002 JAN-C-490, Grade 1 JAN-F-495 U.S.A. 57-0-2, Type II, Class C U.S.A. 51-70-1, Finish 22.02, Class C U.S.A. 50-60-1 16 E4 (Ships)
STEEL	"PERMADINE" Zinc Phosphate Coating Chemical	Rust and corrosion prevention	Nuts, bolts, screws, hardware items, tools, guns, cartridge clips, fire control instruments, metallic belt links, steel aircraft parts, certain steel projectiles and many other components.	MIL-C-16232 U.S.A. 57-0-2, Type II, Class B U.S.A. 51-70-1, Finish 22.02, Class B Navy Aeronautical M-364 U.S.A. 72-53 (See An-F-20)
STEEL	"THERMOIL-GRANODINE" Manganese-iron Phosphate Coating	Wear-resistance anti-galling, safe break-in of friction or rubbing parts. Rust proofing.	Friction surfaces such as pistons, piston rings, gears, cylinder liners, camshafts, tappets, crankshafts, rocker arms, etc. Small arms, weapon components. Hardware items, etc.	MIL-C-16232 U.S.A. 57-0-2, Type II, Class A U.S.A. 51-70-1, Finish 22.02 Class A Navy Aeronautical M-364 U.S.A. 72-53 (See AN-F-20)
STEEL	"GRANODRAW" Zinc-iron Phosphate Coating	Improved drawing, extrusion, and cold forming	Blanks and shells for cold forming, heavy stampings; tubs; tubing for forming or drawing; wire; rod; etc.	———
ALUMINUM	"ALODINE" Protective Coating	Improved paint adhesion and corrosion resistance	Aluminum products of similar design such as refrigerator parts, wall tile, signs, washing machine tubs, etc; aircraft and aircraft parts; bazookas (rocket launchers), helmets, belt buckles, clothes dryers, clothesline, rocket motors, etc., aluminum strip or sheet stock.	MIL-C-5541 (See also QPL-5541-1) MIL-S-5002 AN-F-20 U.S. Navord O.S. 675 16 E4 (Ships) AN-C-170 (See MIL-C-5541) U.S.A. 72-53 (See AN-F-20)
ZINC	"LITHOFORM" Zinc Phosphate Coating Chemical	Improved paint adhesion	Zinc alloy die castings; zinc or cadmium plated sheet or components; hot dip galvanized stock; galvanneal; signs; siding; roofing; galvanized truck bodies; etc.	QQ-P-416 RR-C-82 JAN-F-495 AN-F-20 U.S.N. Appendix 6 U.S.A. 72-53 (See AN-F-20)

CHEMICALS ACP PROCESSES

WRITE FOR DESCRIPTIVE FOLDERS ON THE ABOVE CHEMICALS AND FOR INFORMATION ON YOUR OWN METAL PROTECTION PROBLEMS

CHEMICALS ACP PROCESSES

CHAPTER NEWS

history as it is being made. He commented that a picture can be only as good and as useful as the man behind the camera, and that no military communications system can be wholly effective without providing within its service the ability to record, transmit, and deliver pictorial information. "As we continue to develop and expand our integrated and flexible communications to keep pace with the era of supersonic speeds and atomic power," he said, "we must ever be alert in assuring that full consideration be given to one of the most potent of all forms of communication—the transmission of intelligence in pictorial form."

An exhibit of some of the photographic equipment used by the Signal Corps engineering laboratories was set up at the meeting and included a 70 mm combat camera, a 16 mm projector, a 10" land type spotting camera, and a display of electrophotography and xerography.

Rear Admiral Joseph Redman, chapter president, presided at the luncheon meeting in the National Press Club and introduced the guests at the head table as follows: Maj. Gen. F. H. Lanahan; Dr. Gilbert H. Grosvenor, editor of National Geographic Magazine; Brig. Gen. Emil Lenzer, Col. Stodter, Col. R. C. Barrett, Col. Haskell Cleaves, Col. James S. Willis, Col. Percy Black, Col. Wm. D. Hamlin, Col. W. B. Bess, Col. Marcellus Kunitz, and Col. R. B. Tomlinson.

Arrangements for the very successful affair which was attended by 250 members and guests were made by J. R. B. Crigler, program chairman, with the assistance of John T. Kent and James O'Donnell of the Chesapeake & Potomac Telephone Co.

Flash!!!

Petition for charter for a Paris Chapter of the AFCA was approved at national headquarters just as SIGNAL went to press. Initial plans for such a chapter had been formulated by Maj. Gen. F. H. Lanahan while he was Chief Signal Officer of SHAPE.

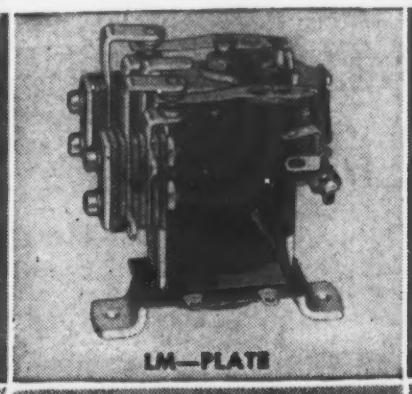
Chapter officers have been designated as follows: president—John T. Quinn; 1st vice-president—Maj. Gen. Lanahan, who although now on duty in the states is carried by the chapter as an honorary member and officer; 2nd vice-president—Maj. Gen. F. L. Ankenbrandt; 3rd vice-president—Col. G. H. Palmer; secretary—Maj. A. W. Hall; treasurer—Maj. R. N. McNitt.

Col. Quinn, who saw active duty in the Signal Corps in both World Wars, is now a member of the technical staff of S. R. E. Defense Programs Division. He was active for many years in the American Signal Corps Association, a predecessor of the AFCA. General Ankenbrandt, formerly a national vice-president of the AFCA, and Colonel Palmer, once a director of the Chicago Chapter, are veterans of the association.

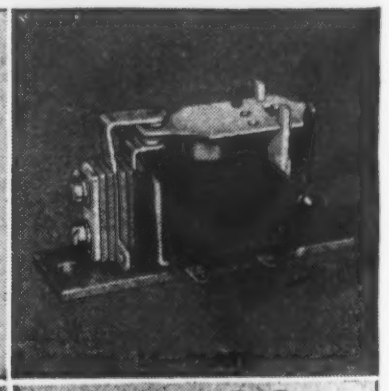
MH—SMALL TELEPHONE

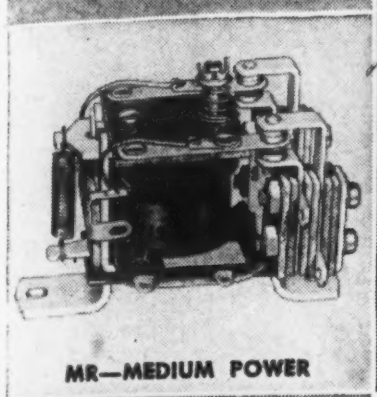
ST—SHORT TELEPHONE

LT—LONG TELEPHONE

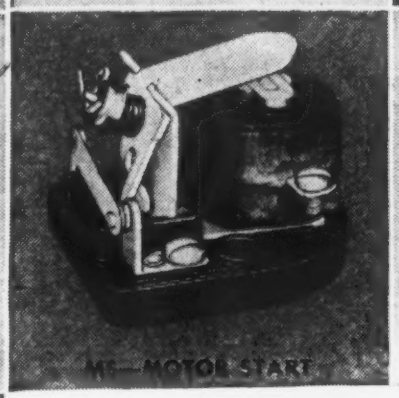


LM—PLATE

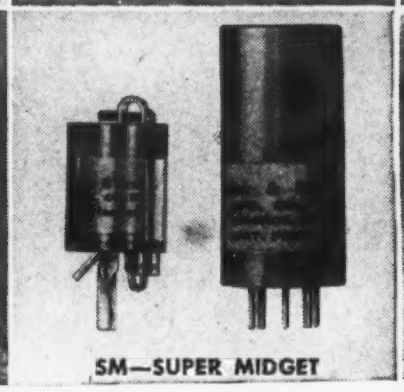




MR—MEDIUM POWER



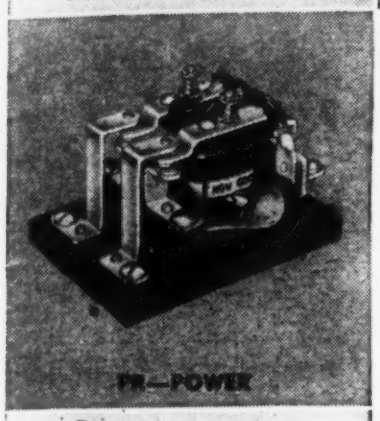
MS—MOTOR START



SM—SUPER MIDGET

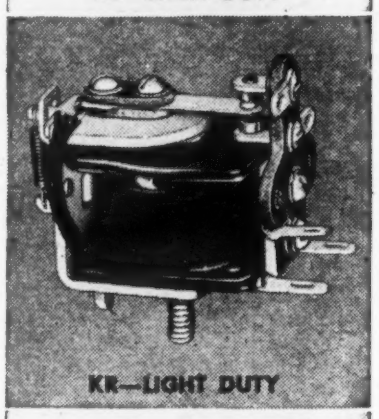
MG—HAMP

SU—MULTIPLE LEAF

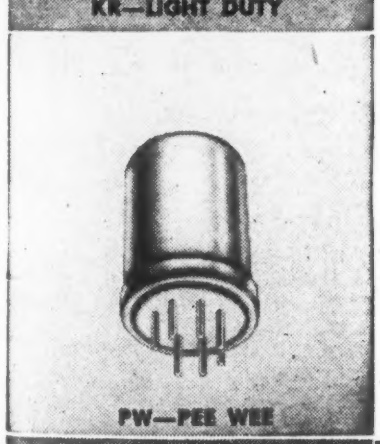


PR—POWER

KL—LIGHT DUTY



KR—LIGHT DUTY



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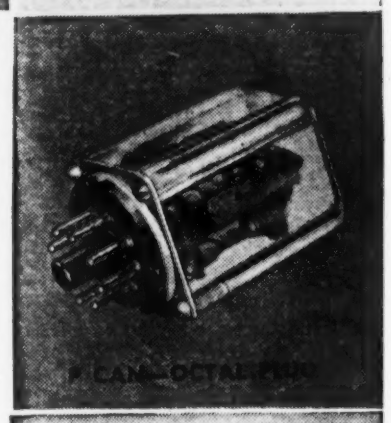
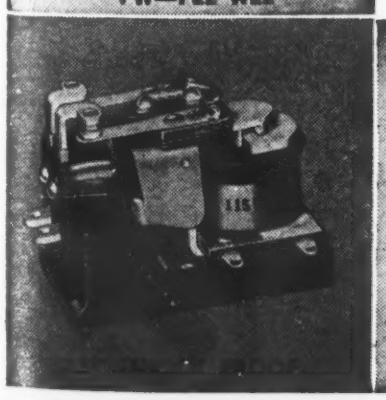


P CAN—OCTAL PLUG

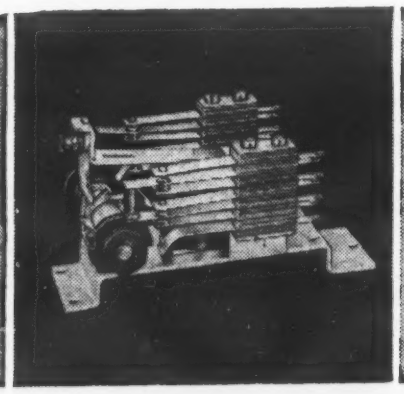
K CAN—OCTAL PLUG

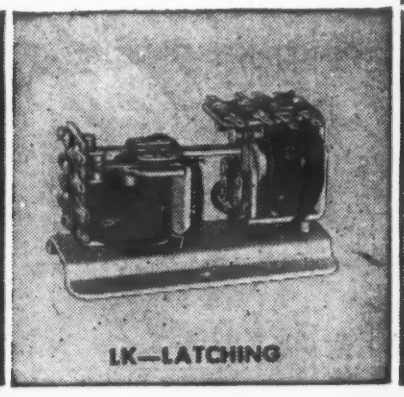
K CAN—SOLDER TERMINAL

M CAN—14 PRONG PLUG

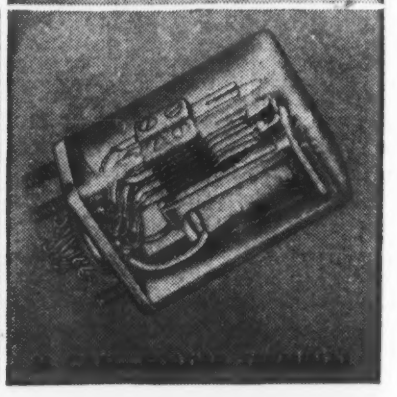


FR—PHOTO FLASH





LK—LATCHING



NEWS

Communications-Electronics-Photography

Nippon Communications System Sends Round-World Message

The Nippon Telegraph & Telephone Public Corp., which operates Japan's telecommunications system, literally sent itself a letter Oct. 22, when to demonstrate to the Japanese public the value and speed of international communications, officials of the Nippon organization dispatched a "round-the-world" telegram from Tokyo. The globe-girdling transmission was completed in 17 minutes.

The message, which read "we are at your service any time for your overseas communications," was signed by the President of the Nippon Telegraph & Telephone Public Corp. as a feature to stimulate the Japanese public's interest in overseas communications.

The communication was sent over the route of Tokyo-San Francisco-New York-London-Bombay-Osaka-Tokyo with the Central Hall in the Japanese capital as the scene of the demonstration at the destination point.

Mackay Radio & Telegraph Co., subsidiary of American Cable & Radio Corp., handled the message from Tokyo to San Francisco to New York, as part of the cooperation in the demonstration.

Western Union Facsimile Banking System

Through a new intracite facsimile telegraph system, named Intrafax, provided by the Western Union Telegraph Co., the Federal Reserve Bank of New York and 15 large New York City banks Oct. 15 began flashing automatically in picture form transfers of more than a billion dollars a day. This marks the first time in banking history that signatures transmitted by facsimile have been used for fund transfers on such a large scale.

The main facsimile operating center is located at the Federal Reserve Bank under supervision of Otto Susen, Chief of the Wire Transfer Division, and Peter P. Lang, Manager of the Collection Department of the Federal Reserve Bank.

The New York City banks have been, up to the present inauguration of the new Intrafax system, using messengers to carry requests and advices back and forth to the Federal Reserve Bank. The new Intrafax system is anticipated to provide both greater speed and a more even flow of the work involved in handling more than 1000 transfers daily. Facsimile transmission of a transfer request or an advice takes two and a half minutes.

To make a money transfer—often millions of dollars in a single request—the necessary instructions are filled in on a special form and signed by an authorized official of the bank. The form is transmitted by facsimile, with an exact picture of the form and the signature of the bank official. This is transmitted and received by push-button operation of the facsimile system. For out-of-town transfers, such as a New York City bank wishing to send money to a bank in Texas for one of its customers, the Federal Reserve Bank of New York wires instructions over the Federal Reserve System's telegraph network leased from Western Union after receiving the transfer form and authorization from a New York bank to the Federal Reserve Bank of Dallas, and within an hour the money is credited to the account of the New York bank's Texas customer.

Air Force C-E Officer New General

The promotion of Colonel Harold W. Grant to Brigadier General was announced recently. General Grant, Executive Officer for the Joint Air Defense Board, Colorado Springs, is best known by Air Force Communications-Electronics for his work in connection with the establishment of the C-E Staff Officers Course of the Air Command & Staff School in 1948 at Maxwell AFB.

Full Industrialization of Atomic Energy Program on the Way

Full industrialization of a major portion of the nation's atomic energy program is the next logical stage in the development of the program, an executive of Sylvania Electric Products Inc. said at a two-day meeting on atomic energy of the National Industrial Conference Board.

Stanley B. Roboff, manager of industrial coordination for Sylvania's Atomic Energy Division, said industrial participation with private capital would unleash the unequaled incentive which competition provides and would send the atomic energy program into "a new era of advancement." New sales opportunities in the atomic energy field would be opened to a large segment of American industry, Mr. Roboff said, whereas at present, because of limitations of the existing Atomic Energy Act, there is only a small number of fields in which private capital has been invested in atomic energy. As examples of current instances of private investment, he cited the prospecting, mining and working of uranium ore; the preparation and distribution of isotopes; and the field of nuclear instrumentation.

To obtain the full benefit of private investment and greater industrial participation in the atomic energy program, Mr. Roboff recommended two major changes. First, he said, the Atomic Energy Act of 1946 should be revised to enable private ownership of fissionable materials and the facilities for producing these materials. Secondly, the official U.S. Atomic Energy program should include more peace-time objectives. He described as a far-sighted move the AEC's encouragement of private power companies and other industrial concerns to survey the possibilities of producing commercial electric power from atomic reactors.

Posing a hypothetical question: "Are we turning over to private industry ideas developed at the taxpayers' expense and which rightfully

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Roland C. Davies, Editor
National Press Building
Washington, D. C.

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belong to all the taxpayers?" Mr. Roboff asserted, "the present cost of the program to the taxpayers is of such proportions that the industrialization of the program will certainly result in a tremendous saving of future expense to the taxpayer; and at the same time he will reap the great additional benefits to be derived from industrialization."

Sacramento Signal Depot Wins American Legion Award

Wilton Kister, Senior Vice-Commander, Department of California, American Legion, recently presented the Sacramento Signal Depot the Legion's highest award in appreciation of the Depot's outstanding aid in hiring the handicapped and re-habilitating disabled veterans.

It is the first time in the Legion's history that its national award for helping handicapped veterans has been given to a government agency. The Signal Depot's success in its continuing rehabilitation program, the legion stated, has become an outstanding example for other agencies of government and industry.

Leslie E. Wood, mayor of the city of Sacramento urged all Sacramento employers to observe National Employ The Physically Handicapped Week. In his proclamation, the mayor stated that the American Legion chose the Sacramento Signal Depot for recognition for its outstanding job in rehabilitation.

Lt. Col. Leo Tamamian of the Sacramento Signal Depot received the award on behalf of Col. Sidney N. Storbratten, Commanding Officer, and the entire Signal Depot.

ANOTHER AWARD RECENTLY PRESENTED at the Sacramento Signal Depot was made to Colonel Floyd T. Gillespie, Commanding Officer of the Depot until he retired recently after 35 years of Army service. Col. Gillespie was presented with a certificate of recognition by the Sacramento Chamber of Commerce "for his outstanding civic leadership and selfless service to the people of Sacramento."

Wilton Kister, Senior Vice-Commander, Department of California, American Legion, presents Lt. Col. Leo Tamamian, Deputy Commander, a certificate of appreciation from the National American Legion for outstanding effort made by the Secramento Signal Depot in employing handicapped persons.

Charles C. Berg, left, Sacramento Signal Depot employee and one of the top award winners for his suggestions to re-use signs and standardize sign sizes is presented seventy dollars by Col. Sidney N. Storbraaten, commanding officer of the installation. Berg is one of 50 depot employees receiving cash awards for suggestions submitted and approved.

Officials of U. S. Navy, RCA and NBC Preview 'Victory at Sea'

Officials of the U.S. Navy, Radio Corporation of America and the National Broadcasting Company attended a preview of two episodes of the television film series Victory At Sea, October 15 at the U.S. Naval Air Station, Anacostia, D. C. The 26-program series, telecast over the NBC-TV network beginning Oct. 26, has been prepared by RCA-NBC in cooperation with the U.S. Navy.

The special showing of the first two episodes was arranged for Admiral William M. Fechteler, Chief of Naval Operations. Heading the visiting RCA-NBC officials were Brig. General David Sarnoff, Chairman of the Board of RCA, and Joseph H. McConnell, President of NBC.

In introducing the two episodes, "Design for War" and "The Pacific Boils Over," Robert W. Sarnoff, vice president in charge of the Television Film Division of NBC, described "Victory at Sea" as the most complete picture of sea power ever presented.

"In the 26 years of its existence," Mr. Sarnoff said, "the National Broadcasting Company has had no more challenging task than the production of these 26 half-hour programs—portraying the story of sea power during World War II—which constitute 'Victory at Sea.' Without the assistance and splendid cooperation of the United States Navy, this story could never have been made available to television."

Tracing the origin of the idea for this television series, Mr. Sarnoff continued:

"Henry Salomon, the producer, who collaborated with Admiral Samuel Morison in writing the history of Naval Operations in World War II, came to me three years ago with the idea of adapting the history of modern sea power for the television audience, as well as preserving it as a record for posterity."

In addition to Admiral Fechteler, Naval officials who attended the preview included the Honorable John F. Floberg, Assistant Secretary of the Navy for Air, the Honorable Herbert Askins, Assistant Secretary of the Navy, General L. C. Shepherd, Jr., Commandant of the U.S. Marine Corps, Vice-Admiral F. S. Low, Deputy Chief of Naval Operations, and Capt. W. Karig, technical advisor for "Victory at Sea".

The series will be telecast by the British Broadcasting Corporation in England, beginning Oct. 27.

Past National Commander of U. S. Signal Corps Association Honored by Cuba

After more than a half century of waiting, Warren L. Jacobus of Irvington, New Jersey, finally received the Spanish-American War medal from the Cuban government. Correspondence concerning his citation and medal was begun in 1900.

Back at the turn of the century, when the newly-discharged Signal Corps sergeant was launching his studies at the New York Law School, he received a letter from a Cuban official stating that he had been awarded the medal. Jacobus replied and waited patiently for the citation to arrive.

Ten years later, the Cuban government sent him an application to fill out—a matter of form for all medal recipients. He complied with their wishes and once again sat back to await the long delayed honor.

In November, 1950 a letter from the Cuban Undersecretary of State arrived, asking confirmation of the application so that they could proceed with the final resolution on the matter. Once again, Jacobus replied. On August 30, 1952, Warren Jacobus received his long-awaited medal.

Mr. Jacobus, who celebrated his 81st birthday on November 16th, is a past national commander of the United States Veteran Signal Corps Association, one of the organizations which preceded the AFCA, and he is now a member of the AFCA.

1953 Coast Guard Academy Examinations

FEBRUARY 24 AND 25

Competitive examinations for appointment to the U.S. Coast Guard Academy, New London, Conn., will be held in 109 major cities on February 24 and 25, 1953, it was announced recently.

High School graduates, or seniors who expect to be graduated by June 30, 1953, should submit their applications before January 15. A minimum of 15 credits is required, including three units of English, two units of Algebra, and one unit each of Plane Geometry and Physics. To be physically eligible, an applicant must be between the ages of 17 and 22, 66 to 76 inches in height, have 20/20 uncorrected vision in each eye, and have at least 20 vital serviceable natural teeth.

Successful candidates pursue a four-year engineering course, and, in addition, receive practical and professional training vital to the education of Coast Guard officers. This training includes summer practice cruises to foreign ports during which cadets put into actual use their theoretical and practical studies. Upon completion of the four year course, cadets are tendered the degree of Bachelor of Science and a commission as ensign in the U.S. Coast Guard.

Athletic and social programs at the Academy provide a pleasant diversion from the rigorous academic schedule. The varsity football, basketball, and baseball teams, and many others, give a good account of themselves in intercollegiate competition, while intramural sports round out the program and provide competition for all cadets.

Qualified military personnel may also take the exam. Inquiries should be addressed to the Commandant (PTP), U.S. Coast Guard, Washington 25, D. C.

AACS Reorganization

TINKER AIR FORCE BASE, Okla. It was announced recently by Brig. Gen. Thomas L. Bryan, Jr., Commanding General of the 1800th Airways and Air Communications Service (AACS) Wing, that the Wing has reorganized its administrative structure by slashing the four group organization to three. In setting up this new structure, over a half-million dollars will be saved yearly, along with a better utilization of the Group's manpower, and at the same time will improve the administrative efficiency of the Wing.

This reduction of headquarters personnel and consequent increase in the number of actual workers in the field is in line with General Hoyt S. Vandenberg's desire that Air Force operational efficiency be increased by eliminating wherever possible unnecessary red tape "paper workers," thereby relieving them to fill manpower shortages in other AACS communications facilities. The operation of those communications facilities is the basic reason for the existence of the Airways and Air Communications Service.

The 1800th AACS Wing incorporates the continental United States and Bermuda, with engineering and maintenance responsibilities in the Caribbean area. The old organizational structure consisted of four groups located at Mitchel AF Base, N. Y., Warner-Robins AF Base, Ga., Kelly AF Base, Tex. and Hamilton AF Base, Calif. Under the present three

Coast Guard Academy cadets, on a practice cruise, go up the main shrouds of the Cutter EAGLE.

group structure, the 1803d AACS Group at Kelly AF Base was eliminated.

Shortly after the reorganization went into effect, it was proven that the three group set-up streamlined the administrative structure of the Wing considerably by releasing personnel for duty elsewhere. These highly skilled communications and electronics technicians are now able to move into their specialized fields.

The 1800th AACS Wing, which is charged with the operation of airways communications and ground electronic aids to U. S. military aircraft, also provides installation and maintenance engineering for the equipment; supplies mobile units for major air commands, and establishes and maintains a flight checking system.

PHOTOGRAPHY

ARMY DIVISIONS USING PANORAMIC PHOTOGRAPHS FOR FIRE DIRECTION USE

Photos taken at Forward Observation Posts Lapped to Give Commanders Front Line Intelligence

With the Eighth United States Army in Korea—Panoramic photographs of division front lines are being used in Korea in conjunction with normal terrain maps to provide intelligence for combat commanders.

Panoramic photographs are normally associated with motion pictures where an entire selected area is "panned" by photographing, in a continuous movement, from one extremity of an area to the other. Signal Corps photographers in Korea provide this same coverage in a still photograph which is later compared with an actual map to identify and locate terrain features for artillery fire direction centers which have missions to fire on a given area. In addition, new officers may be familiarized with the general terrain, patrols may be briefed on the best means to reach an objective, tank commanders may be oriented for "tank shoots", and front line observers, using the photos, may better identify features on the terrain for calling in fire missions. A second panoramic is often used for the "before and after" comparison to determine the effectiveness of fire missions.

To get these important photographs, Signal Corps cameramen select a good forward observation post from 500 to 1500 yards from the enemy's front lines, set up their Speed Graphic camera on a tripod, attach a F/4.7, 127 mm lens, and begin their coverage. They take pictures of an entire regimental front, allowing a twenty-five per cent overlop on each picture, and record the exact coordination of each camera location.

The photographing done, the film is developed, printed, and enlarged to 8 x 10 inch size or larger as required. After enlarging, the overlapping prints are cut and matched to form a continuous mosaic of the front. The coordination of the observation post from which the photos were taken are recorded on the mosaic. Division Artillery photo interpretation personnel then label the terrain features, check points, and other areas of interest and copies are furnishd to those concerned.

Although the pictures have proven invaluable, the Signal Corps is looking forward to supplementing this method with aerial photographs taken from Army aircraft. The use of aircraft will speed up delivery of the photographs to the place of developing and to the ultimate user.

The fine photography of James A. King, Farmington, Kansas, brought us this snow scene for our most recent photo contest.

This new wide-angle aerial camera lens, produced by Bausch & Lomb Optical Company, covers a field of more than 90 degrees. Ruth Lammersahl, one of the co-designers, holds one of the lenses, called the Cartogon, developed for the U. S. Air Force.

Soft Water Aids Shutter Bugs

For the amateur photographer who emerges from the darkroom with a snow storm of spots on pictures of the family dog, the vacation trip, or the new baby, here's a word of advice from an unexpected source.

"The trouble may be in your water supply," George Klumb, director of the Culligan Soft Water Institute, Northbrook, Ill., said recently.

Processing film in hard water can often ruin the best efforts of the amateur photographer, Klumb explained.

Most amateur photographers may not know that cloudy water will cause trouble if used for rinsing negatives or prints. Grit and other insoluble material can scratch or spot delicate photographic emulsions.

Even a crystal clear water can cause objectionable spots and scum on negatives and prints because hardness-producing calcium and magnesium are invisible. Water which contains iron is frequently crystal clear when drawn from the tap, but becomes clouded with rusty sediment after short exposure to air. Even

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very small amounts of such sediment can cause objectionable staining in photographic rinsing.

An additional problem which hard water presents is the accumulation of sludges and deposits in rinsing equipment during continued use.

Filtered zeolite softened water is recommended for final rinsing of negatives and prints, as a rinse after development, and just before the "short stop" bath.

Demineralized or distilled water is recommended for the preparation of the alkaline developer and acid-hypo solutions, because any other water might contain a slight acidity or alkalinit to impare the action of the solution.

Slight alkalinity can be especially troublesome if a white sludge forms in the hypo-fixing bath when the fixing bath becomes alkaline. Negatives and prints become stained and improperly washed.

The country's amateur photographers spend an estimated average of $150 to $300 annually on equipment and supplies. According to the Culligan's Soft Water Institute, soft water safeguards this investment and produces better photographic results.

New Film for Industrial Photographers Can Be Used to Make Movies in the Dark

A new infrared-sensitive motion picture film which literally permits motion pictures to be made in the dark with infrared illumination, or in the semi-dark without, has just been announced by the Eastman Kodak Company.

The new film has been described as having a total "red speed" greater than any other material on the market. The company said that in tests conducted at the University of Rochester, successful motion pictures were made of audience reactions when house lights in a theater were dimmed to 1/70th of normal room illumination.

The new film can be used in any standard 16 or 35mm motion picture camera accepting roll film or 16 mm magazines. It will not, however, be available in 35 mm cassette loadings for 35mm still cameras. Lengths over 100 ft. will require the acceptance of spliced rolls.

Known as Kodak Spectroscopic I-N Film, the new film was originally intended for use by spectrographic laboratories. It is now, however, being used for many other purposes such as audience reaction and ultra high-speed camera photography where its sensitivity to the infrared range of the spectrum makes it particularly valuable for recording—without supplemental allumination—the flow and action of molten or hot metals.

The new film will not be processed by the Eastman Kodak Company. Recommended development is 4 to 8 minutes in Kodak Developer D-19. Development results in a photographic negative which must be printed on another piece of film to produce a positive print for projection purposes.

This film is available only through Kodak Industrial dealers.

Merry Christmas from AFCA and the camera of David W. Brown, Potsdam, N. Y.

Eighth Army in Korea Needs Projectors

In a recent note to SIGNAL from General Guest, Signal Officer of the Eighth Army in Korea, he advises.

"DESERVING EDUCATIONAL AGENCY IN KOREA HAS NEED FOR GLASS SLIDE PROJECTORS. WE WOULD APPRECIATE RECEIVING THAT MAGIC LANTERN IN YOUR ATTIC."

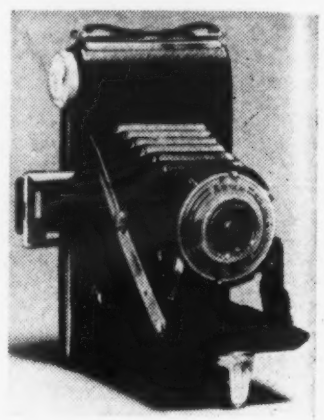
For the convenience of anyone who has a glass slide projector for this good cause, if sent to the Pentagon, they will be packaged for overseas shipment. They should be sent to:

Mr. Bruce Quisenberry
Chief, Office of Technical Liaison
Office of the Chief Signal Officer
U. S. Army
The Pentagon
Washington 25, D. C.

Hope some of you readers can help General Guest out.

NEW PRODUCTS For The Photographer

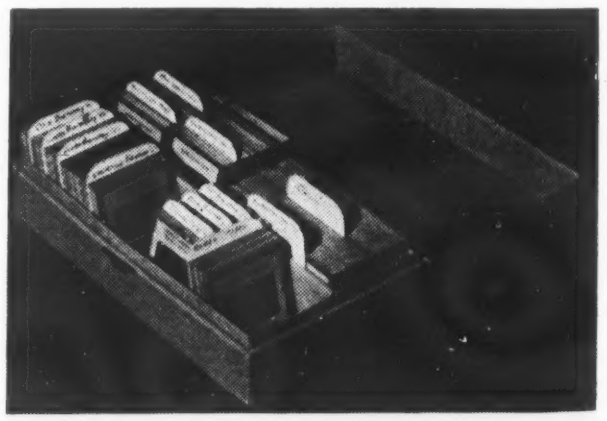
The new Viking Readyset camera has just been announced by ANSCO, division of General Aniline & Film Corp. As its name implies, the camera is ready to shoot when it is opened, and is nearly as simple as a box camera, yet very compact and easy to carry. Included in its features are a flash synchronized shutter with standard 3mm contact; two-position diaphragm control for best exposure under all light conditions; two-position focusing control for sharper images at all distances from 5 feet to infinity.



In the book field is a new edition of the standard reference work for amateur photographers, "THIS IS PHOTOGRAPHY," by T. H. Miller and Wyatt Brummitt. This new edition brings the book completely up to date and better fits it to picture taking needs. This book is slanted for the "in-between" photographer—the person who is not strictly a beginner and, at the same time, not a finished technician.

Recently announced by GRAFLEX is the new Graflex "22," a 2¼ x 2¼ twin-lens reflex camera. The new camera has an f/3.5 Graflex coated lens, corrected for use with modern color films, in a Century 1/200 sec. shutter with built-in flash synchronization. For speed and ease in focusing, it features a side focusing knob rather than a front focus adjustment. Focusing ranges from 3 feet to infinity, and the "22" has a built-in magnifier for critical ground-glass focusing and an eye-level sportsfinder for action shots. The new camera uses 120 film.

A sturdy, attractive, and inexpensive file box for 2" x 2" slides is now available from EASTMAN KODAK. Known as the Kodaslide Flexo File, the box holds either 360 cardboard slides, 124 glass slides, or 160 Kodak Stereo slides. The File contains four sections as well as 12 removable septums. The septums are higher than the slides and, therefore, group titles written on them will remain in full view when the file is in use.



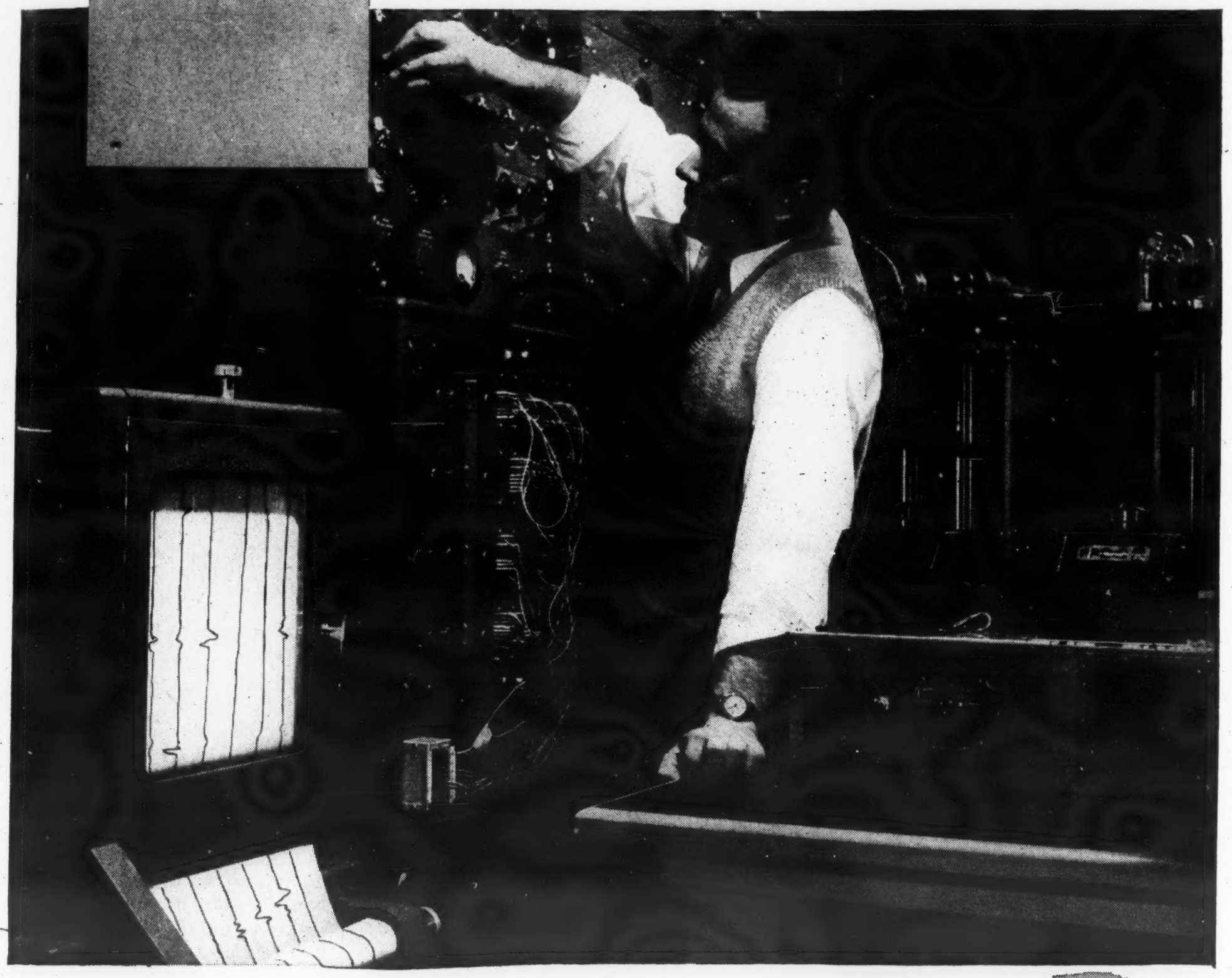
Flying Tomorrow's Jets

Sperry research engineers are seeking solutions for tomorrow's flight control problems while they develop new ways to better the performance of control equipment currently flying.

This analog computer is duplicating flight conditions of a new high-performance jet bomber being "flown" automatically by the Gyropilot* flight control. Here, for instance, a Sperry engineer checks the performance of the airplane and automatic pilot during the bombing run.

In test after test – in laboratory and its great Flight Research Center, MacArthur Field, Long Island–Sperry flight controls are continuing to prove their capacity to maintain stable all-weather flight in jet, propeller-driven, rotary-wing, lighter-than-air and pilotless aircraft.

For 40 years Sperry has been working continually on flight control problems. With this wealth of experience to build on, tomorrow's problems are being met by today's research and engineering.



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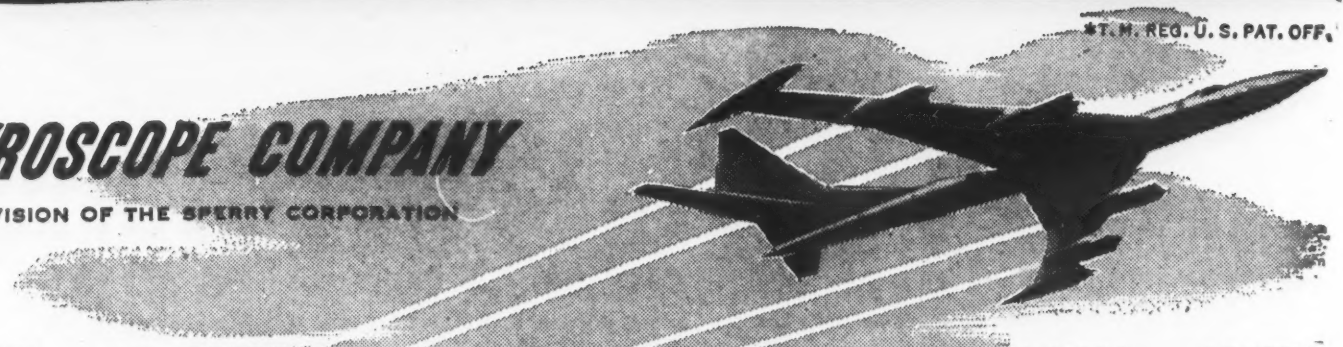

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Radio Military Amateurs

Amateur Radio Station K3NRU

Amateur radio station K3NRU, located at the Naval Reserve Training Center, Williamsport, Pa., is one of the many active amateur stations located at various Naval Reserve activities throughout the country. This station has made hundreds of contacts with amateur stations within the United States, as well as over fifty contacts with foreign countries.

K3NRU is prepared for emergency communications in the event of local disaster and is equipped with gasoline-driven generators to provide emergency power.

Among the active operators at K3NRU are E. G. Fegley, ETC, USNR (W3MPB) and E. L. Burton, RM3, USNR (W8JBQ). Also qualified to operate K3NRU are G. K. Thomas, SN, USNR and R. A. Sheef, SA, USNR, both of whom are members of Naval Reserve Organized Surface Division 4-59 which holds weekly drills at the Training Center.

Robert Lee Burton, RM3, USNR (W8JBQ) adds a new QSL card to the collection at amateur station K3NRU, Naval Reserve Training Center, Williamsport, Pa.

AARL Simulated Emergency Test Successful

Thousands of amateur radio operators across the country demonstrated their preparedness to cope with disaster by participating in a nationwide test October 11 and 12. The annual Simulated Emergency Test, sponsored by the American Radio Relay League, provided the means whereby the effectiveness of civil defense and disaster communications plans could be tested and proven.

Local AARL Emergency Coordinators in hundreds of cities and towns simulated communications emergencies of the kind likely to be encountered in actual disasters—floods, fires, tornadoes—and atomic attack. Civil Defense was the keynote of most of the local tests.

For years, radio amateurs have been called on in emergencies to establish communications circuits when regular facilities fail. Early this year when devastating tornadoes hit Arkansas and Tennessee, and during the recent California earthquakes, radio amateurs proved invaluable in efficiently handling emergency traffic. Those taking part in the Simulated Emergency Test gained additional experience in this vital role of public service.

Mars Assists Red Cross In ARRL Test

Amateur radio station K4USA, headquarters station for the Military Affiliate Radio System (Army), participated in the 1952 Simulated Emergency Test on October 11 and 12, 1952 as a fixed-station, alternate-site, radio center for the American National Red Cross Telecommunications Center, Washington, D. C.

K4USA assisted Red Cross Station W3PZA during the exercise, monitoring frequencies 3550 kc, 7100 kc, 14050 kc and 29640 kc. Thirty messages were received at the MARS station for delivery to Red Cross headquarters. K4USA operators were Sfc. Henry Camp, W4UAH; Sfc. James Allison, W4VHI; Sgt. Albert McFarley, operator only; Sgt. A. R. Hermenegilda, operator only; Cpl. Gerald Pals, W9FZA; Richard Young, W3PZW; Cpl. William Welsh, W4RDT; Cpl. Joan Eaton, W3SET; Pfc. Allen Tellier, WISYY.

Air Force Provides Frequency for Balloon Experiment

The U. S. Air Force Military Affiliate Radio System provided the VHF frequency 143.99 and the Air Force MARS call AF5CA to the American Radio Relay League for their annual trans-continental VHF-free balloon experiment on October 25th. The idea was sponsored by the Purple Blow MARS Club of Albuquerque. New Mexico.

At this year's event, the club launched a better designed balloon equipped with a CW transmitter of about ½ watt power, with a life expectancy of approximately 20 hours. The balloon drifted sending out its call sign and a secret three letter cipher for authentication. This exercise grew out of the curiosity of the New Mexico club in the VHF spectrum and its possibilities for "ham" usage.

(Ed. Note: In a later report to SIGNAL, *we were advised that the balloon was tracked on 143.99 mc for 6 hours to 30,000 ft. where either the battery died or was frozen.)*

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Amateurs Help to Run River Speedboat Race

Military and civilian amateurs teamed up to provide communications for the annual Colorado River speedboat races October 5, 1952. Six portable, battery powered stations were established along the 115 mile course which starts at Needles, Calif., and runs to Parker Dam and back. The frequency 3807kc was used with A-3 emission. The net was controlled by W3CE (H. Timmons) at Needles Airport. W7LGS (H. Heller) was at the starting position, W7JU (R. Warner) was at Topock, W6CMN (W. Schuch) was stationed at Site Six on Lake Havasee, and W6DDE (J. Wilcox) operated at Parker Dam.

Major Long Will Head Army Mars Program

The Army recently announced the appointment of Major James A. Long, Signal Corps, to be Army Chief of the Military Affiliate Radio System (MARS), replacing Captain Lester A. Peterson who has received a new assignment with Headquarters, U. S. Army, Alaska.

Major Long will direct the operation of Army MARS and coordinate policy with the Air Force MARS Chief, Major Charles C. Mack. By joint agreement he also will serve as Secretary of the MARS Advisory Committee (representatives of the Armed Forces, the American National Red Cross, Federal Civil Defense Administration, Federal Communications Commission and the American Radio Relay League) which meets quarterly to advise the Chief Signal Officer, USA, and the Director of Communications, USAF.

New Pamphlet for Novice Class "Hams"

Promotion of interest in obtaining a Federal license of Novice Class amateur radio operator, not only for the enjoyment of personal two-way radio communication but also as a stepping stone to a professional electronics career in industry or military service, is the subject of a pamphlet just issued by the American Radio Relay League.

Entitled "You Can Be There," the booklet describes many international adventures awaiting amateur operators, and points up one highlight of recent years—direct radio contact with "Kon-Tiki," the raft on which six Norwegian scientists drifted across the Pacific with amateur channels their primary means of communication. "An amateur's neighborhood is the World," the booklet explains—"you can walk down almost any 'Main Street' anywhere and meet friends who speak your language."

The Novice Class license was established by the Federal Communications Commission on July 1, 1951, to encourage interest among the nation's youth in the science of radio. Examination requirements are elementary—radio code at 5 words per minute (the same speed required for the Boy Scout merit badge in radio), and a basic knowledge of electrical and radio fundamentals. Since that time more than 11,000 persons have obtained Novice licenses, swelling the total of U.S. "hams" to over 100,000 and helping in the job of providing emergency communications systems for community civil defense.

Charleston Naval Base Radio Club

The Charleston Naval Base Radio Club, call letters W4VSX, was organized on 29 January 1952 to promote and encourage amateur radio activities for naval and civilian personnel attached to, or employed by, activities of the Naval Base. At present, the club has thirty-six licensed amateurs and twenty-six prospective licensees in its membership. The licensed group boasts twenty Advanced Class, ten General Class, and six Novice Class amateur operators' licenses.

Officers of the Club are:

President—Mr. James Yost, W4DNE
Vice President — CDR Paul White, USNR
Secretary Treasurer—LCDR Paul H. Lee, USNR, W4RXO
Trustee—Mr. Frank Woolridge, W4IZD

The club is located in Building 76, outside of the main gate entrance to the Naval Base, where meetings are held the 1st and 3rd Tuesdays of each month. Equipment consists of a BC-610 transmitter, LM frequency meter, BC794 Super-Pro receiver, and several other receivers. The station operates on all amateur bands from 10 to 80 meters using both CW and phone. Several committees have been appointed to work out arrangements for field days, facilities, civilian defense and emergency communications. Of special significance is the Novice Assistance Committee, which conducts nightly code-practice sessions for the prospective amateur members of the club. Interested members also plan to handle local Red Cross traffic as a public service, particularly for the local Naval hospital. Members active in other phases of amateur radio are: W3AN/4 Capt. W. A. Smith, USN, an old-timer operating on all bands from his home in Summerville ,S. C.; W4ANK, CDR F. H. Wood, USNR, who is SCM for the ARRL section of South Carolina and one of the club's main traffic handlers; W4BIH, CDR F. R. Knight, USNR, another old-timer from Florida, who is very active on 80- and 40-meter CW; W4MSN, Capt. H. H. McCarley, USN, president of the Charleston AFCA Chapter, who is busy building an all-band transmitter with an 813 in the final stage; W4RXO, LCDR Paul H. Lee, USNR, who is quite active in 10- and 20-meter phone, is also an experimenter and has written several articles for CQ magazines; and W4VNV, LTJG Alex Murphy, USNR, who recently obtained his Novice and Technician licenses.

At each club meeting, an interesting discussion, movie, or technical demonstration is given on amateur radio subjects, with routine business kept to a minimum. In this way, active membership is encouraged and retained. The club has been of great benefit to the morale of naval personnel in the are who are licensed or prospective amateurs, as it gives them a place to operate and meet other hams. It also gives the majority of the members, who are civilians, a chance to meet their brother amateurs of the naval service in the pursuit of amateur radio, and in a truly democratic way.

MARS Transmits President's United Nations Day Message

In a demonstration of how the scientific hobby of amateur radio affords a bond of unity between citizens of all civilized countries, facilities of the Military Affiliate Radio System were used October 24, 1952 to transmit a United Nations Day greeting from President Truman to amateur radio operators throughout the world.

The message was transmitted by MARS headquarters stations WAR and AIR, twice by A-3 (voice) emission and twice by A-1 (radiotelegraphy) emission. Voice transmissions were made at 0100Z and 0400Z. Morse code transmission started at 0130Z and 0430Z.

All persons with communications or short wave receivers were invited to "copy" the transmission and send a postcard acknowledging receipt of it to MARS Headquarters in the Pentagon.

The American Radio Relay League and the State Department's Voice of America program assisted MARS Headquarters in alerting amateurs to listen for the special MARS UN Day transmission.

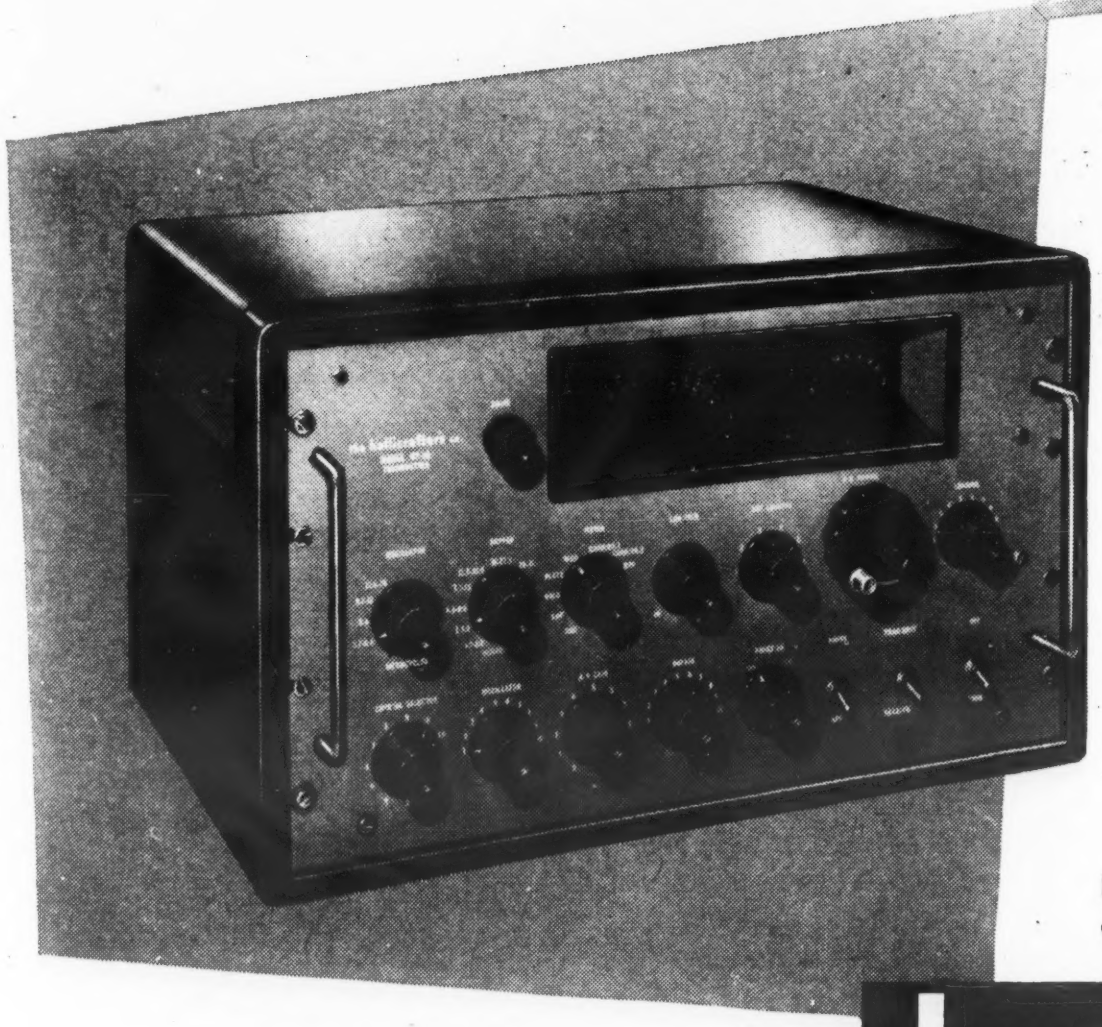
Finally! No More TV Interference Problems!

The New Hallicrafters HT-20 is T.V.I. proofed!*

Here's the news you've been waiting for—a medium power transmitter (100 watts) that solves the problem of television interference once and for all. The Hallicrafters HT-20 is the answer. Completely tested in the lab and in the field, here is a transmitter that is truly T.V.I. Proofed*.

This is not simply a revamped design, but completely new circuitry to meet this problem. Physically, too, the entire transmitter is new from the massive, two-piece, completely rigid chassis to the electrical air cooling system of the final amplifier tube.

See this newest Hallicrafters—get the complete story of the finest transmitter, dollar for dollar, on the market today. Or write Hallicrafters direct for full details.



Check these features!

- **100 watts carrier power with high level (Class AB2) modulation on any band.**
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- **Weight of transmitter, in cabinet, 105 pounds.**
- **All transformers and chokes operate "cool"—maximum temperature rise of 40 degrees. This means fewer replacements, long operating life.**
- **Operates equally well from relay rack or in cabinet on table top.**
- **Uses 117 volts, 60 cycle AC.**
- **Moderate cost.**

* **T.V.I. PROOFED**—means that this transmitter has circuitry specifically designed to eliminate spurious and harmonic energies that result in television interference.

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DIGEST OF THE ARMED FORCES RESERVE ACT OF 1952

(Public Law 476-82nd Congress)

The President on 9 July 1952, signed the bill, H. R. 5426,

Sec 201 designed for the purpose of providing trained units and qualified individuals to be available for active duty in the Armed Forces in time of war, national emergency or any time that the National security may require. Except for the immediate implementation of the provisions concerning: (1) indefinite term appointments; (2) a five year FAD category statement; and (3) uniform allowances,

Sec 202 this act shall become effective on 1 Jan 53 and consolidates the reserve forces by setting up the following seven reserve components: (1) the National Guard; (2) the Army Reserve; (3) the Naval Reserve; (4) the Air National Guard; (5) the Air Force Reserve; (6) the Marine Corps Reserve; and (7) the Coast Guard

Sec 203 Reserve. This grants to the President the power to fix the maximum numerical strength of each component in the absence of such authorization by Congress.

Sec 204 Under this Act, there is established in each of the Armed Forces a Ready Reserve, a Standby Reserve, and a Retired Reserve to be composed of the members

Sec 205 of the seven reserve components. The Bill provides that the Ready Reserve consist of members who are liable for active duty in time of war or national emergency declared by Congress or proclaimed by the President, or otherwise authorized by law and sets the authorized personnel strength at 1,500,000 members. It places in the Ready Reserve, units of the National Guard, the Air National Guard, transferees in active reserve status, and all members of the reserve components assigned to units organized for the purpose of serving as such,

Sec 206 provides that the Standby Reserve consist of members liable for active duty only in time of war or national emergency declared by Congress or otherwise authoized by law.

Sec 207 Provides that the Retired Reserve consist of members whose names are placed on retired lists upon application of the individual, if otherwise qualified time of war or national emergency declared by Congress or authorized by law.

Sec 208F The law further permits any member of the Ready Reserve not serving on extended active duty, except in time of war or national emergency, upon his request to be transferred to the Standby Reserve if: (1) he has served five years on active duty in the Armed Forces; (2) he has served at least twelve months in the Armed Forces on active duty between 7 December 1941 and 2 September 1945, and at least twelve months after 25 June 1950; (3) or served as much as eight years in reserve components after 2 September 1945. Prohibits

Sec 208G a member of a unit of the National Guard or the Air National Guard from being transferred to the Standby Reserve without the consent of the Governor of the

Sec 209 State in which the unit was authorized. Permits a qualified individual who is transferred to a reserve component of an Armed Force pursuant to the UMT and Service Act to enlist in such Armed Force as he may elect to participate in such programs authorized and then shall be required to serve the remaining period of his service, and such participation shall be credited against total periods of obligated periods imposed by the UMT and Service Act.

Sec 211 Established within the standby Reserve is on inactive list (providing for the return to active status under such conditions as the appropriate Secretary

Sec 211B may prescribe) and provides that such members while on the inactive list shall not be eligible for pay, promotion, or retirement awards. Authorizes the

Sec 217 appropriate Secretary to prescribe the: (1) qualifications for membership in reserve components relating to physical, mental, moral, professional, and age;

Sec 216 (2) training categories for reserve components according to types and degrees with an adequate equitable system for the promotion of members; and (3)

Sec 227 periods of enlistment except during a war or national emergency when the period

Sec 217C shall be for the duration plus six months. Provides that no one who has not held a commission in some component of the Armed Forces may be commissioned in a grade higher than major or lieutenant commander, except upon recommendation of a Board of Officers convened by the appropriate Secretary.

Sec 243 Authorizes a $200.00 uniform allowance for commissioned officers: (1) upon reporting for first active duty tour of more than 90 days; or (2) upon completion of 14 days' active duty, or active duty for training (field training, for example); or (3) after at least fourteen two-hour drills. Exceptions: those who received a uniform allowance as an officer under any other law, and ex-Regulars within two years after leaving the Service. Another $50.00 is granted upon completion of each four years' satisfactory reserve component service after enactment of this Act, including at least fourteen days' active duty, or active duty for training, but excluding tours of more than 90 days from the four-year computation. Anyone who previously received a uniform allowance as an officer must wait at least four years from the time he was entitled to that allowance, before he receives this $50.00. A further $100.00 is granted at the start of each tour of 90 days or more of active duty for training—BUT not if an initial allowance of more than $200.00 was received during the current tour, or within the preceding two years. And at least two years must elapse between the 90 days-or-more active duty tours for another $100.00 to be collected.

Sec 219 Grants the President the power to appoint all commissioned officers of the reserve components under the grade of general and flag officers and permits the

Sec 218 President to appoint all higher officers by and with the advice and consent of the Senate. Authorizes the appropriate Secretary to appoint all warrant officers of the reserve components. Declares that all appointments of reserve components the same

(*Concluded on page 68 col. 3*)

RUGGED as a RHINO . . .

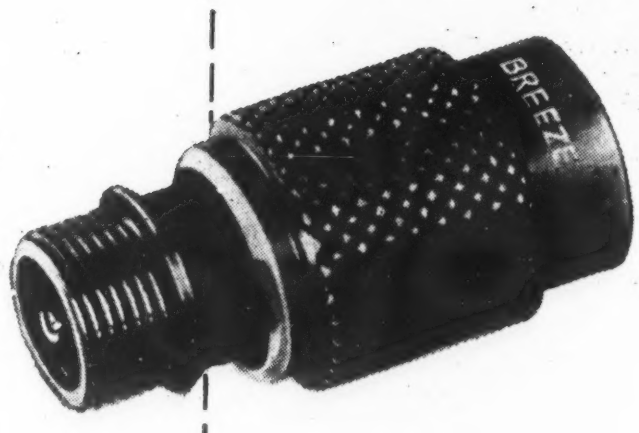
Quick as a Fox!

Two Special Purpose Connectors *by*

BREEZE MARK

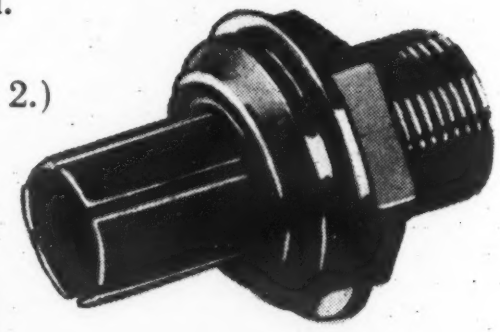
Battery Connectors

8-pin type for both A and B batteries used in all types of field communication equipment. "RUGGEDIZED" for extra security and long service life: polarizing stud is ALL METAL and all metal parts are cadmium plated and sealed with an iridite sealer. Cable may be brought out at any desired side position and locked. Handy bail makes removal from inaccessible places easy.



Quick Disconnect

Simply push male and female members together and lock. To disconnect with minimum resistance, pull back sleeve on plug shell and disconnect. Exceptionally low disengaging force required (less than 6 lbs., excepting pin friction). Vibration proof, moisture-proofed with synthetic rubber insert. Meets AN pin pattern and voltage requirements, in accordance with MIL C-5015. Plug shell and coupling sleeve are aluminum alloy, cadmium plated and iridite-sealed. (Federal Spec. QQP – 416, Type 2.)



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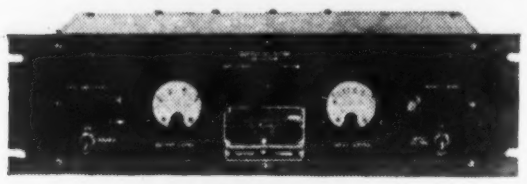
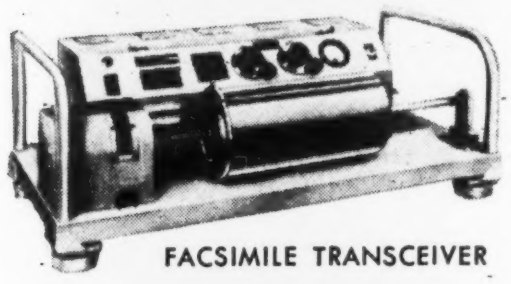


KEYER ADAPTER



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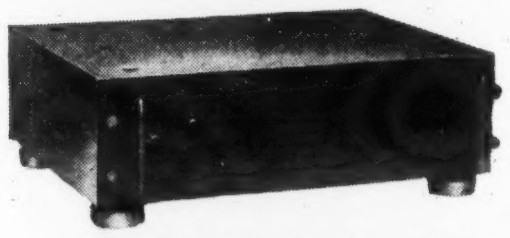
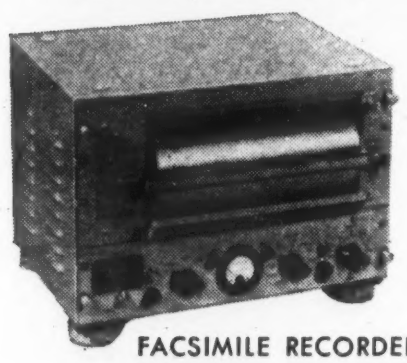


FREQUENCY SHIFT CONVERTER



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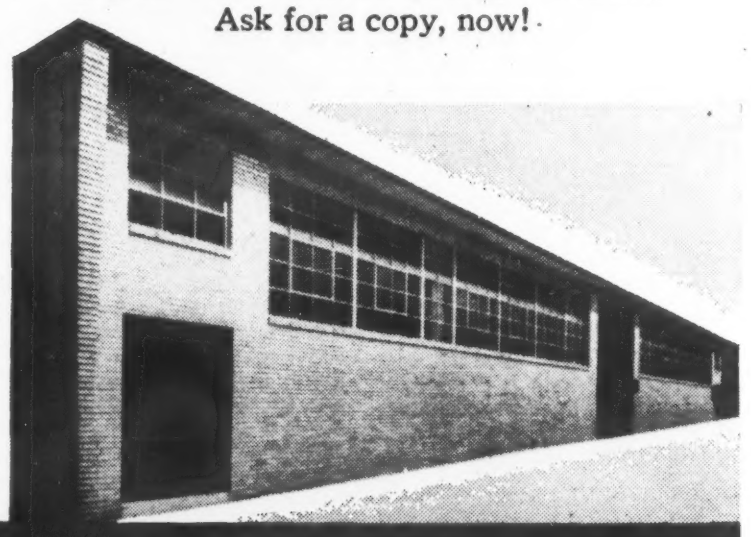


SPECIALISTS IN CLIMATE PROOF PACKAGING FOR
THE ARMED FORCES AND INDUSTRIAL ORDNANCE

Armed Forces Reserve Act

(Continued from page 66)

pay, allowance and benefits established for members

Sec 246 of the regular Armed Forces. Permits civil employment while on inactive status and foreign employment without resigning from the reserve. Provides that the

Sec 267 discharge of officers shall be at the pleasure of the President and the discharge of other members shall be under the regulations of the appropriate Sec-

Sec 250 retary in accordance with present practice. Declares that the regulars and reserve shall be treated equally in the administration of laws applicable to both. That is, reserve components personnel serving on active duty may be detailed or assigned to any duty authorized for Regulars. Relative precedence

Sec 216B shall be based upon date of rank. Provides that all reservists on voluntary

Sec 235 extended active duty may request a five-year contract with the Government and severence pay if they are released earlier without their consent, except in a widespread, general demobilization, as after World War II. The law further requires that

Sec 233C in any call-up, a minimum of 30 days' notice is to be given if possible, and "reasonable" consideration is to be given the duration and nature of the individuals previous service, family responsibilities, and importance of his

Sec 254 job to national health, safety or interest. Directs that all boards for appointment, promotion, demotion, involuntary relief from active duty, discharge or retirement of reservists, will include appropriate members from the reserve components.

Sec 257 Establishes the Reseve Forces Policy Board with an Assistant Secretary of Defense, and an Undersecretary or Assistant Secretary in each of the Military Departments, whose principal "among other" responsibilities is reserve affairs, and the Army and Air Force Chiefs of Staff each is to have a general officer directly responsible to him for reserve affairs. Directs the Secretary to require a complete up-to-date dissemination of information of interest to the reserve components and to the public in general.

The aircraft industry uses Automatic Electric relays and stepping switches in guided missiles, in automatic pilots—and for many other uses.

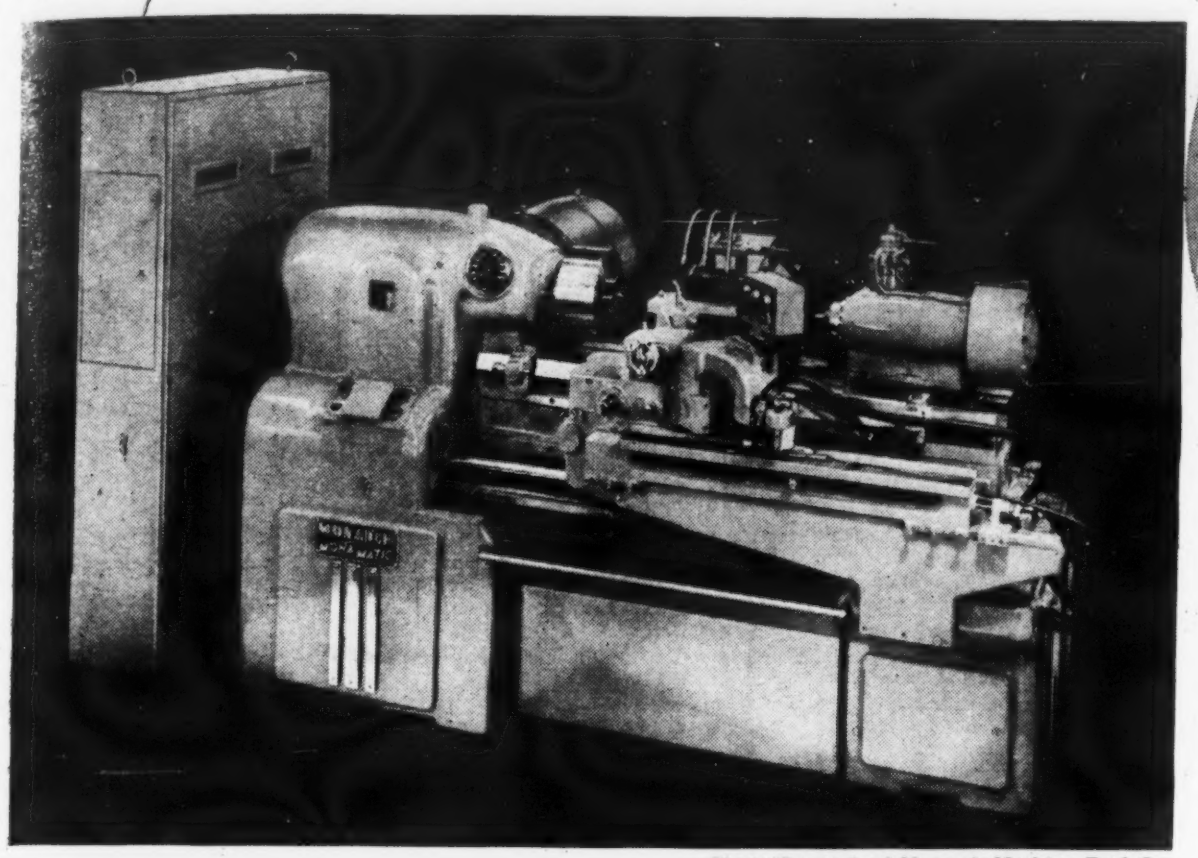
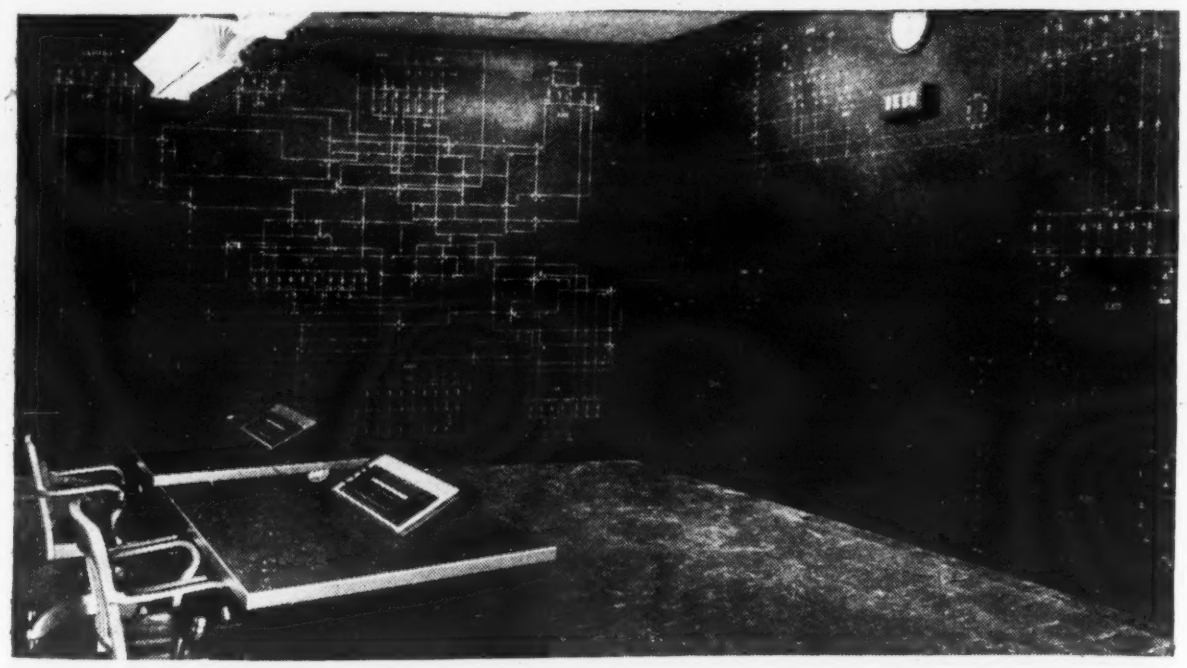


Photo Courtesy of Monarch Machine Tool Co.

In the modern lathe shown above, Automatic Electric relays control tool positioning, feed and cutting speed, in proper sequence.



Shown is a typical application of Automatic Electric controls in a large power system. Other systems find application in many different fields.

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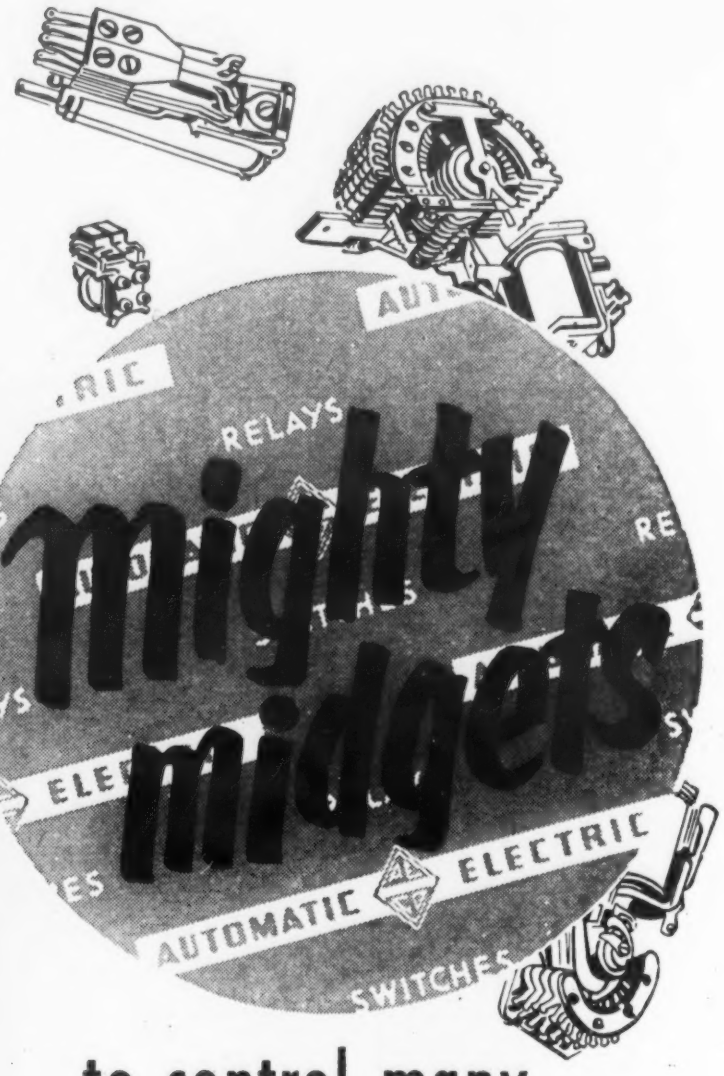
Telemetering of liquids and gases
Indicating and recording instruments
Control of signals and signaling equipment
Calculating and computing devices
Radio and TV broadcasting control
Electric power distribution
Regulation of lighting systems
Photoelectric measurement and control
Production counting and other totaling processes
Control for electrical equipment



...to control many industrial processes

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BILL MAULDIN IN KOREA. W. W. Norton & Co., Inc., 171 pages. $2.95.

Bill Mauldin is back—but the humor, satire, and fun of the Infantryman's favorite storyteller now has a new companion in the wonderful optimism so striking in this book.

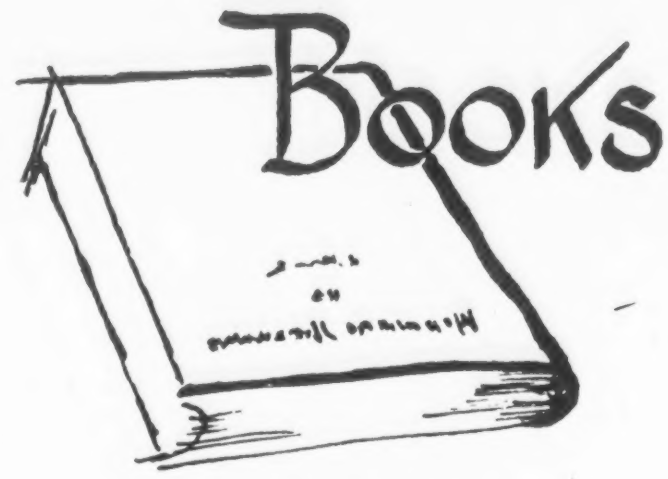
For this assignment in Korea, Mauldin occupies what is for him the exceedingly privileged position of correspondent. What he found in Korea is good. The fighting men perched on the slopes and peaks of the Korea mountains form, he thinks, the finest army the United States has ever had—a crack, professional corps, high in morale and savvy, its graduates constantly growing in number through a rotation plan that works. And the picture he paints of the Marines and the Navy—both services strange and alarming to him at first—is enough to gladden every American heart.

Amusingly accented with the usual Mauldin-style cartoons, the story is a unique close-up of the Korean war as seen by the most penetratingly observant private soldier of them all.

ELECTRONICS FOR COMMUNICATION ENGINEERS. By John Markus and Vin Zeluff. McGraw-Hill Book Company, Inc., 681 pages. $10.00.

This book gives the engineer carefully selected design articles with many equations, charts, nomographs, and data to save him time in research and experimental effort. With this book at hand, access is easy to essential information on many important recent developments in the fields of radio communication, radio broadcasting, television, and radar.

The book is composed of 252 outstanding articles which have appeared in ELECTRONICS magazine, and arranged in sixteen chapters, including such subjects as amplifiers, components, filters, oscillators, power supplies, and transmission lines.



FRANK MARTINS, Manager

Worthy of special mention is the chapter on Electronic Music, a relatively new branch of electronics that is today increasing rapidly in importance. Ten significant articles give design data and circuit details of both commercial and custom-built electronic organs of various types.

Chapter arrangement alphabetically by subject, and indexing by title, author, and cross index of subjects make use of the book convenient and fast.

HOW TO DEVELOP, PRINT AND ENLARGE YOUR OWN PICTURES. By Jack O. Flynn, Albert J. Rosenberg, and Alan Kellock. McGraw-Hill Book Company, Inc., 113 pages. $3.75.

In simple language, the authors of this book have explained negative developing, contact printing, and enlarging in both basic and advanced techniques. The text is further clarified by detailed pictures of the processes explained.

Every phase of the various methods is ably taught, from the initial negative developing to the final improvement of the prints by various projection control techniques. Materials that are needed, and how to improvise for some of these, are described, and the more advanced techniques of Spot Printing, Vignetting, and Diffusion, to mention a few, are graphically explained.

This book will be welcomed by anyone who uses a camera but who has missed the fun of developing his own pictures because he "just doesn't know how." Following this book, one can enjoy and advance in the art of developing, printing, and enlarging.

THE WAR AGAINST JAPAN, Pictorial Record, U. S. Army in World War II. Office of the Chief of Military History, Department of the Army, 471 pages, $3.50.

This picture review of the War in the Pacific is the third of a series of Pictorial Records of the U. S. Army in World War II. In 462 pages of excellent photographs, credited to Service photographers, with captions describing situations, tactics and terrain, the story is unfolded. From the initial defense operations in 1941, through the hard offensive fighting in the Islands, to the signing of the treaty on the USS *Missouri*, a history is permanently and exactingly related, substantiated with dates, statistics and maps, a history that distinguishes the hard, but well-fought, War in the Pacific.

RADIO ASTRONOMY. By Bernard Lovell and J. A. Clegg. John Wiley & Sons, Inc., 238 pages. $4.00.

In the years since the end of the Second World War the application of radio techniques to the study of various problems, which have hitherto been the domain of astronomy, has led to remarkable results. A new science, Radio Astronomy, has emerged, very closely allied to astronomy, astrophyhics and physics in subject matter, but mainly using techniques of radio and radar. In this book, the authors give an account of what they believe to be the most important aspects of this new science, and have endeavored to make the book readable to as wide a circle of readers as possible.

New and Interesting On The Market

FUNDAMENTALS OF ENGINEERING ELECTRONICS. By William G. Dow. 2nd Edition, John Wiley & Sons, Inc., 627 pages, $8.50. . . . Up-to-date edition of comprehensive textbook by University of Michigan professor on fundamentals and principles of electronic engineering incorporating recent progress and developments.

U H F PRACTICES AND PRINCIPLES. By Allan Lytel. John F. Rider Publisher, Inc., 390 pages, 285 illus., $6.00. . . . This book is designed for the student or technician who is familiar with the fundamental concepts and techniques used in standard broadcast receivers. A logical sequence is used to explain ultra-high frequency concepts from their very beginning to their use in complete equipment.

BIOGRAPHY OF AN IDEA. By John Bainbridge. Doubleday & Co., Inc., 381 pages, $4.00. . . . Fact-filled, highly readable story of mutual insurance, traces its history from the Great Fire of London to present-day prominence in American life with the formation of Benjamin Franklin's first mutual insurance firm in Philadelphia 200 years ago the background of the 4,480 present insurance organizations.

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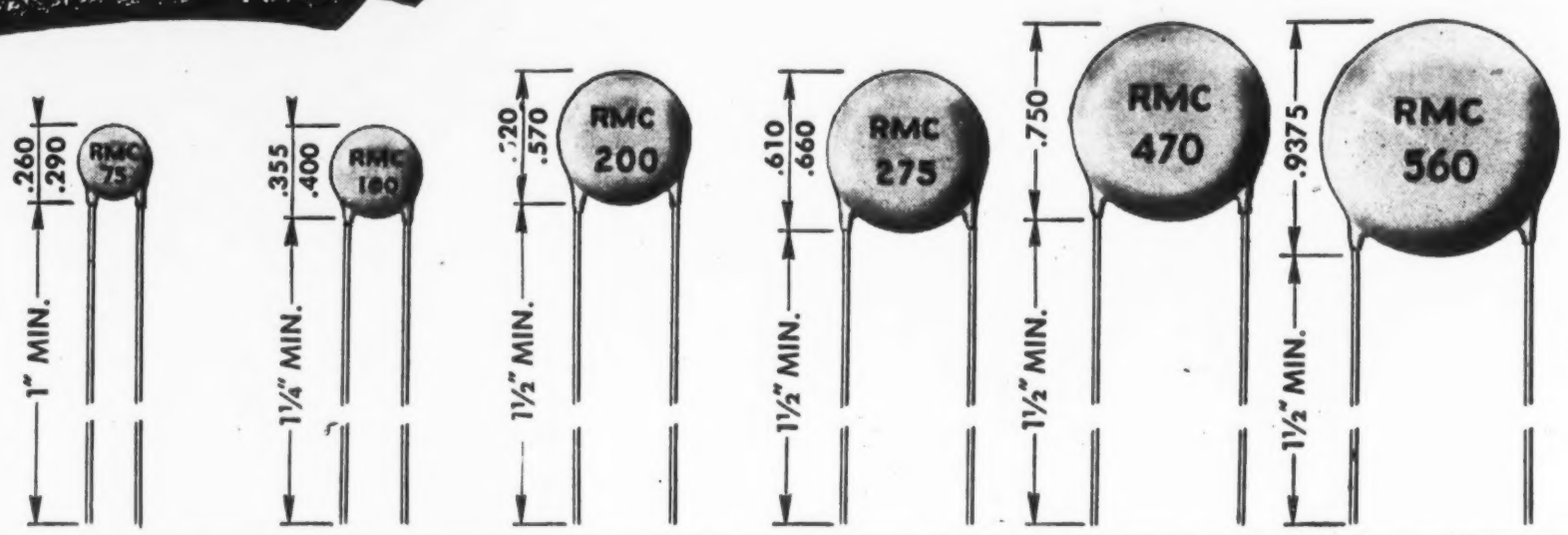


TC	1/4 Dia.	5/16 Dia.	1/2 Dia.	5/8 Dia.	3/4 Dia.	7/8 Dia.
P-100	—	2- 9 MMF	10- 30 MMF	—	—	—
NPO	2- 12 MMF	13- 27	28- 60	61- 75 MMF	76-110 MMF	111-150 MMF
N- 33	2- 15	16- 27	28- 60	61- 75	76-110	111-150
N- 80	2- 15	16- 27	28- 60	61- 75	76-110	111-150
N- 150	2- 15	16- 30	31- 60	61- 75	76-110	111-150
N- 220	2- 15	16- 30	31- 75	76-100	101-140	141-190
N- 330	2- 15	16- 30	31- 75	76-100	101-140	141-190
N- 470	2- 20	21- 40	41- 80	80-120	121-170	171-240
N- 750	5- 25	26- 50	51-150	151-200	201-290	291-350
N-1400	15- 50	51-100	101-200	200-250	251-470	480-560
N-2200	47- 75	76-100	101-200	201-275	276-470	471-560

If the samples you need are not here — send for them.

SPECIFICATIONS

POWER FACTOR: LESS THAN .1% AT 1 MEGACYCLE

WORKING VOLTAGE: 1000 VDC TEST VOLTAGE: 2000 VDC

DIELECTRIC CONSTANT: P-100 14K N-750 88K N-2200 265K NPO 35K N1400 165K

CODING: CAPACITY, TOLERANCE AND TC STAMPED ON DISC

INSULATION: DUREZ PHENOLIC—VACUUM WAXED

LEAKAGE RESISTANCE: INITIAL 7500 MEG OHMS AFTER HUMIDITY 1000 MEG OHMS

LEADS: #22 TINNED COPPER (.026 DIA.)

LEAD LENGTH: ¼" BODY 1", 5/16" BODY 1¼", ½" AND LARGER BODY 1½"

TOLERANCES: ±5%, ±10%, ±20%

RMC DISCAPS are Designed to Replace Tubular Ceramic and Mica Condensers at LOWER COST

SEND FOR SAMPLES AND TECHNICAL DATA

DISCAP CERAMIC CONDENSERS

RADIO MATERIALS CORPORATION

GENERAL OFFICE: 3325 N. California Ave., Chicago 18, Ill.

FACTORIES AT CHICAGO, ILL. AND ATTICA, IND.

Two RMC Plants Devoted Exclusively to Ceramic Condensers

Letters TO THE EDITOR..

Music to Our Ears

Dear Colonel Dixon:

When the magazines I print are moving through the plant, in their various stages of production, I never see them as a complete unit. I see galley proofs, or dummies, or page proofs, — even press sheets, but it is not until I am writing up the bill, after they've been mailed, that I get a solid chance to look at a magazine as a complete, rounded unit.

I've just billed the new SIGNAL, and what I saw demanded comment. I think this is an outstandingly fine issue—possibly the most intelligently, attractive issue you've designed so far. It has the professional feel without over-sophistication. It does the job it was intended to do, but without forcing on the reader's attention that he be consciously aware of how the job is being done. It does not scream for attention, but subtly gets across its ideas which is about the ultimate in magazine designing.

I think you and your staff rate a whole volume of appreciative congratulations.

Sincerely

JOHN FERGUSON III
Monumental Printing Company
Baltimore, Md.

DPA Editorial

. . . I wish to thank you for sending me a copy of the current issue of SIGNAL, and for including the message on electronics in the defense mobilization program on pages 12 and 13.

It is a privilege to appear in the pages of your fine publication, and we all appreciate your work to better acquaint your readers with the objectives and problems of our national mobilization effort.

I must say that the cover treatment is, considering the subject, excellent!

HENRY H. FOWLER
Director, Defense Mobilization

Ransom Quiz

. . . my guess on "Doing It The Hard Way" is the Joly Arco Undamped Wave Transmitter, right?

JAMES MURRAY
Rooster, Michigan

Though I was right on previous Ransom articles I find I am doubtful of this one. . . . Strictly a guess . . . Joly-Arco Undamped Wave Transmitter? Keep up the articles, we enjoy them here.

LOUIS HAGEN
Philadelphia, Pa.

Far Away Places

. . . Believe me it sure is a pleasure to get a fine publication like SIGNAL, and especially so in an isolated place like this. News of the outside world is a pretty scarce item and is always read and reread by most all of us.

Hoping to hear from you, via SIGNAL, I remain,

ROBERT A. NEWBAUER
Keflavic, Iceland

Pen Pal

SIGNAL received a letter from a young Dutch officer interested in corresponding with others interested in communications. Members caring to write may address him as follows:

Cadet Sgt. H. Gorren
c/o Kraaielaan 59A
The Hague, Holland

Ansco

Gentlemen:

Thanks very much for sending me the September-October issue of SIGNAL with the marvelous write-up on the Ansco Cameras. Since I don't normally get the magazine I particularly appreciate your thoughtfulness and I'll forward the pages with the story to the proper people at Ansco who will be just as pleased as I was, I know. Thanks very much.

ELEANOR I. NEY
Public Relations
New York 19, N. Y.

OH MY!

Regarding our correction of an equation in Dr. Oleg Yadoff's article in the Sept.-Oct. issue the editors of SIGNAL received the following:

. . . "now if in the next issue we can apologize for misspelling 'occurrence' we'll be all straightened out for the long hard winter ahead."

Constructively and objectively yours,

H. H. CLEAVES, Col. SigC.

Auld Lang Syne

In reading SIGNAL I have found names of many people with whom I have been associated in the past, and I have resumed correspondence with some.

Just recently I read of Col. F. E. Kidwell, Signal Officer of the 1st Army. He was my commanding officer when I was assigned to the 11th Signal Company in Hawaii. Then I read of Col. G. T. Gillespie, the commanding officer of the Sacramento Signal Depot, retiring from the service—a finer gentleman I have never served under. Then I read of Major David Ulher, the Signal Officer at Fort Meade, Md.—we were enlisted men together.

It sure is wonderful to belong to such a splendid organization as the AFCA.

S/SGT. JULIAN I. FEIGUS
Cambria, California

Field Economic Mobilization Course

I sincerely thank you for carrying the story of the Field Economic Mobilization Course in your September-October issue of SIGNAL. A boost was also given our Correspondence Study Course, "Emergency Management of the National Economy." I also appreciate your thoughtfulness in sending me a copy of this issue.

You may be assured that publications of this kind in magazines such as yours are an invaluable aid to this college in the fulfillment of its mission.

Again, with many thanks,

Sincerely,

W. MCL. HAGUE
Rear Admiral, USN
Commandant

Gentlemen:

Thanks for the copy of the September-October issue of SIGNAL and also for the space you allotted to the Industrial College of the Armed Forces in that issue.

Recently the College has been endeavoring, through the medium of publications such as SIGNAL, to publicize the courses offered by the College which are available to reserve officers and civilians. Our business is picking up and we are receiving more and more applications for both the Field Economic Mobilization Courses and the Correspondence Courses.

Again, thanking you for your consideration and assistance.

B. M. HOVEY
Brigadier General, USAF
Deputy Commandant

In Demand

The SIGNAL magazine is particularly significant to our operations here, therefore, we would like to revise our group representatives under our 1953 membership in the Armed Forces Communications Association so that those members of our organization most interested in this magazine will automatically receive it.

RAYMOND S. PERRY,
Vice President
General Sales Manager
Federal Telephone and
Radio Corporation

Radar Diary

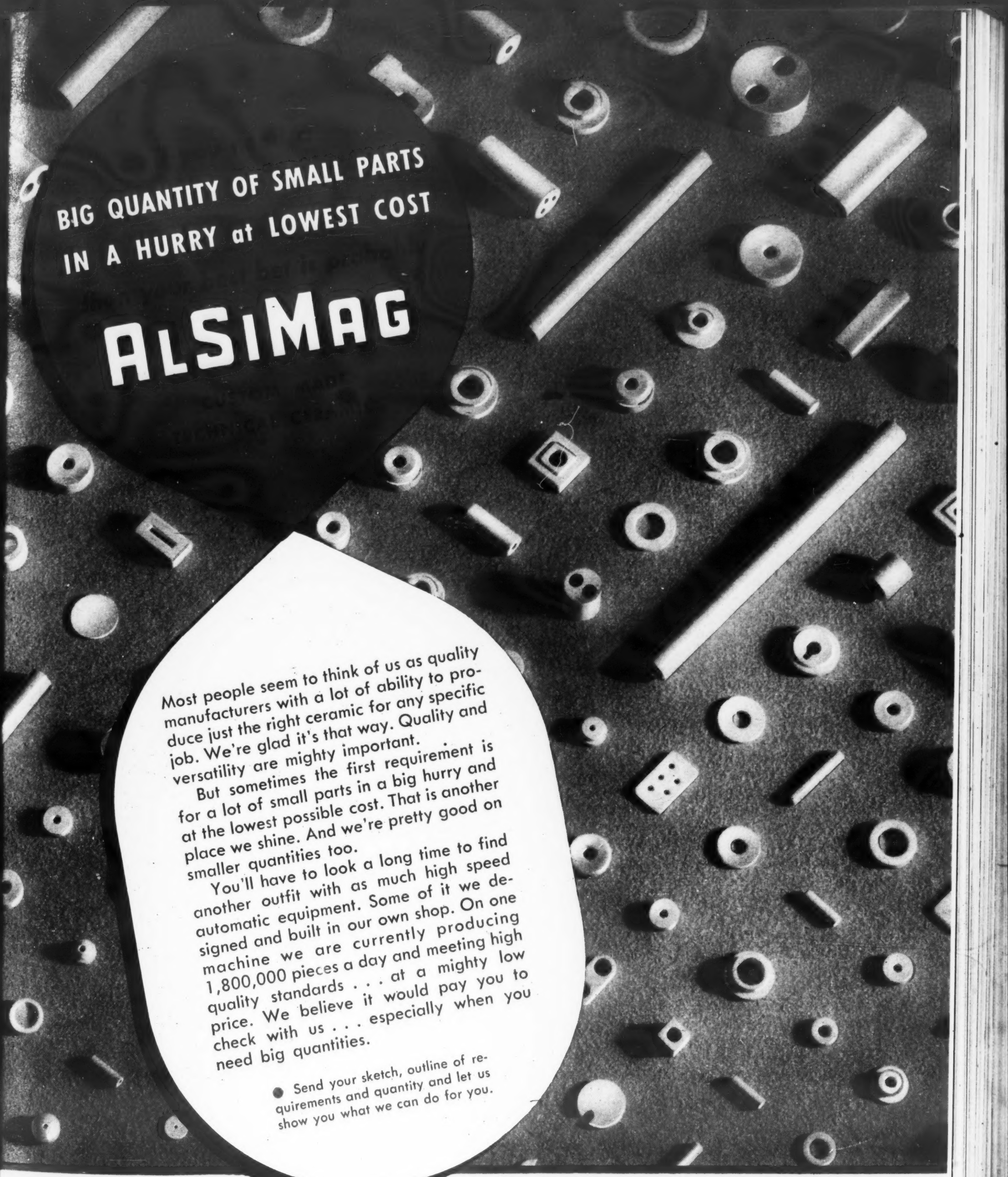
In your September-October issue of SIGNAL you carried "From An Early Radar Diary" . . . a most interesting account of early radar days. Dr. Zahl writes extremely well, in my humble opinion, and I am happy to see material of this quality in our magazine.

HAROLD L. SHAW
New York, N. Y.

Stone Speech

Your reprint of Admiral Stone's speech before the N. Y. World Trade Committee was very interesting to me. Having heard its original delivery, I was glad to have a copy of it.

F. M. BECKWORTH
St. Louis, Mo.



Most people seem to think of us as quality manufacturers with a lot of ability to produce just the right ceramic for any specific job. We're glad it's that way. Quality and versatility are mighty important.

But sometimes the first requirement is for a lot of small parts in a big hurry and at the lowest possible cost. That is another place we shine. And we're pretty good on smaller quantities too.

You'll have to look a long time to find another outfit with as much high speed automatic equipment. Some of it we designed and built in our own shop. On one machine we are currently producing 1,800,000 pieces a day and meeting high quality standards . . . at a mighty low price. We believe it would pay you to check with us . . . especially when you need big quantities.

● Send your sketch, outline of requirements and quantity and let us show you what we can do for you.

51ST YEAR OF CERAMIC LEADERSHIP

AMERICAN LAVA CORPORATION

CHATTANOOGA 5, TENNESSEE

OFFICES: METROPOLITAN AREA: 671 Broad St., Newark, N. J., Mitchell 2-8159 • PHILADELPHIA, 1649 North Broad St., Stevenson 4-2823
SOUTHWEST: John A. Green Co., 6815 Oriole Drive, Dallas 9, Dixon 9918 • NEW ENGLAND, 1374 Massachusetts Ave., Cambridge, Mass., Kirkland 7-4498
LOS ANGELES, 5603 North Huntington Drive, Capitol 1-9114 • CHICAGO, 228 North LaSalle St., Central 6-1721 • ST. LOUIS, 1123 Washington Ave., Garfield 4959

Admiral

(*Continued from page 13*)

and television accounted for over 50% of the industry volume.

Thus, we have a simple picture of a sound organization built under wise and aggressive leadership facing a bright commercial future.

Admiral in World War II

With the ominous warnings all too obvious, Admiral, with one eye on its peaceful future, warily cocked the other one the possibility of war, and built a new plant, in 1940, at Knox Avenue, Chicago, while enlarging its Cortland Street holdings there. The net result was a highly volatile facility of some half million sq. feet—available to the Armed Services if needed—and it was.

In acquiring its valued Army-Navy "E" plus stars, and in post-war renegotiation, Admiral's principle of more for less again paid off. Its dollars of production per man hour of labor established an enviable record which was exceeded nowhere in the electronics industry. The sad-but-true wartime situation which found most of the largest engineering-production companies in the East inadequate to produce the variety and volume of needed military gear had the challenge answered in the Midwest by the electronics manufacturers production plants. Admiral was among these and, without Government financing or subsidy, launched into a new business with the same competitive zeal which characterized its peacetime operations. Its small, but brilliant engineering department, highly skilled in the technique of engineering parts and costs *out* of products, was constantly finding ways to simplify, to make it better, to make it cheaper and above all, to make it faster. This experience, backed by a hard-driving production department and a highly aggressive purchasing department paid off well for Uncle Sam as well as for the Admiral Corporation. It gained recognition and respect from those who viewed the average radio manufacturer as little more than a soldering iron and a screw driver specialist. It pointed out to the defense leaders that here was potentially the answer to the requirements of the ever broadening field of electronic devices.

Admiral undertook the development of airborne bomb and rocket firing radar equipment, participated in the development of the original Special Purpose Radar equipment, the later developments of the improved radar system, the SCR-560 Loran system, the R.D.Z. shipboard receiver, the SCR-503 direction finder, the SCR-510 and 610 vehicular and ground equipment, the AN/APN-1 radar altimeter, and ASB-5 Radar Range indicators, the AVT-15 and AVR-20 aircraft transmitters, remote control units for R.D.Z. and T.D.Z. receivers and transmitters and a long list of other equipments too numerous to mention. Admiral was a prime contractor, a sub-contractor, a developer, and an assistant developer; in short, Admiral was eager and anxious to do its part wherever it was needed and whatever the task.

Its production of 40,000 airborne altimeters at the rate of 6,000 per month, 51,000 SCR-510-610 receivers at the same rate, 10,000 RC-148-351-145-151 IFF receivers and transmitters, established records of which it is justly proud.

Admiral PostWar

Aware of the danger of a concentration of electronic research development and production know-how in the East, such as prevailed prior to World War II, defense planners tried to induce contractors elsewhere to maintain an interest in military equipment after the war. Admiral, feeling that the great and varied experience of the war should not be wasted, responded to the call and produced over $15,000,000 worth of Government contracts between 1946 and 1948.

It continued to maintain its Government Sales Division and set about establishing a laboratory devoted exclusively to this purpose.

With its broadly experienced engineering veterans of the war as the hub, it made certain that practically every engineer it hired was experienced in working with JAN specifications, and thus at the outbreak of Korean hostilities, Admiral was again ready to do its part. Today it holds a substantial volume of Government contracts for development and production in widely varied fields, many of the most complicated nature. In short, Admiral has gained considerable stature in this field and can truly be said to have come of age.

Again it was no easy, casual approach but a well-planned definitely objective program.

First, the establishment of the exclusive engineering group and second, the building of an exclusive Government laboratory. Starting in the new field of radiation detection with a small but select group, and expanding into other fields as it progressed, Admiral has established a solid foundation and an excellent reputation as military developers and producers.

It has a Government laboratory of over 40,000 sq. feet, completed in 1950. Its equipment is of the most modern design and includes many highly specialized pieces of test equipment which have no counterpart, developed and built by its own engineers. There are over 500 pieces of test equipment available to its engineering departments which employs almost 400 people. It has its own technical library containing the latest books, magazines and literature relative to its field. This includes the complete JAN and MIL specification file which is constantly kept up to date. It has its own purchasing department. It maintains its own drafting and blueprinting departments. Its technical writing section occupies over 1600 sq. feet and employs over 25 people. It has a complete printed circuit department.

Admiral has engineering and production type test areas which have complete facilities for JAN and MIL tests for most components and equipments and complete facilities for making conducted and radiated noise measurements as per Johnsville NADC specs. It has successfully completed type testing the complicated Navy UPM 4A radar test set.

It has extensive facilities for nuclear radiation research and development including Colbalt 60 radiation source of very high level.

It maintains a field site in the country fully equipped for measuring oscillator and antenna radiation containing facilities for personnel and equipment.

It maintains a department devoted exclusively to design and maintenance of test equiupment with its own model shop and has been responsible for designing and building an exclusive notch wattmeter, microwave frequency standard, marker frequency standard, special pulse generator, and a special noise generator which it has given the Navy Department permission to use for its own purposes.

It has a completely modern model shop.

It has five stratosphere chambers, three humdiity chambers, three salt spray chamber, and four temperature chambers of huge proportions perhaps equalled nowhere in the Midwest, high voltage equipment, special power; variable frequency supply from 60 to 1800 cycle power supply.

(*Concluded on page 76 col. 1*)

Look to Admiral for
extensive facilities and experience in the field of

RADIAC
Radioactivity Detection Identification and Computation

COBALT 60 SOURCE

Pictured here is Admiral's Cobalt 60 source of gamma radiation, rated at 12 curies. Few industry laboratories are equipped with sources of such intensity. The equipment is principally used to calibrate equipment during development, to spot check production models and to maintain secondary standards.

RADIAC is a familiar word at Admiral. In volume and variety, Admiral's production of radiac equipment, already completed and pending, exceeds that of any other manufacturer.

Original research and development work has been conducted by Admiral on instruments covering the broadest range of radiation intensities . . . everything from personnel dosimeters to isobar survey instruments. Production in volume is currently under way.

In addition to the work on radiac, Admiral is currently engaged in development and production of radar, radar test equipment, receivers and transmitters. Extensive, ably staffed laboratories and experienced production crews are available for additional government electronics output.

Admiral Corporation

Chicago 47, Illinois

Admiral

(*Continued from page 74*)

200 watts capacity, 400 cycle motor generator supply-200 watts capacity.

Naturally, since Admiral is one of the world's largest television manufacturers it can be expected to have a large TV engineering department. In addition to the large black and white TV laboratory, it also maintains two comprehensive color TV groups, well-equipped with all the apparatus necessary to this type of work, including the following specialized equipment: Flying Spot Scanner, Dichroic Display, Gamma Amplifiers, Black Level Setters and Dampers, Encoder, Synchronizing Generators, Electronic Color Bar Generator, Distributing System, Tristimulus photometer, etc.

Admiral is presently engaged under Government contracts in the fields of radiation detection, proximity fuses, airborne all channel transceivers, shipboard and shore radar test equipment, ground and vehicular communications equipment, etc.

With this background of personnel, equipment and experience, Admiral is particularly adaptable to engage in development and research as well as production in the fields of detection and measurement of nuclear radiation, radar and I.F.F. circuits and equipment, VHF and UHF receivers, transmitters, and testing apparatus, guided missles where microwave, pulse and TV techniques are involved, counter-measure equipment, radio direction finding, TV for military application, radio communications, meteorological instrumentation, telemetering systems, miniaturization and printed circuitry. Add to this the complete engineering, plant equipment and mass production experience in the field of metal forming and plastics moulding on a large scale basis, and you have a reliable facility in the Admiral Corporation.

Government Sales Division headquarters are located in Washington, D. C., with branches in Dayton, Ohio, and Red Bank, New Jersey, through which constant close relationship with the military service is maintained.

The defense leaders of our country have emphasized that sound bodies and minds from which to fashion their forces are essential. It follows that sound, capable industrial institutions are likewise essential.

In this respect the Admiral Corporation places its resources at their disposal—Ashore—Afloat or Aloft.

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Office of Technical Services

(*Continued from page 31*)

Basic electrical networks are described that compensate for the thermal time lag of thermocouples and resistance thermometer elements. Networks requiring no amplifiers can provide a thirty-fold reduction in effective time lag. Networks using commercially available amplifiers can provide a thousand-fold reduction in the effective time lag. Code No. of Report: PB 106946.

Integrating Amplifier for the Oscillographic Recording of Magnetic Flux. Treats: Amplifiers, Integrating—Design—Sweden. Code No. of Report: PB 105979.

Static Frequency Transformers for Small Electric Motors. An experimental study of the possibilities of operating single-phase asynchronous motors by means of static frequency transformers. The investigation deals, first, with frequency doubler circuits using combinations of transductors and dry cell valves and second, with frequency tripler circuits using three-phase transformers with saturated core and secondary winding induced by the zero-sequence flux component. Code No. of Report: PB 106021.

Indesyn, A Television System Without Transmitted Synchronization. This report comprises an analysis of television synchronization, which was conducted in order to determine under what conditions synchronization signals may be eliminated from the transmitted television signal. Elimination of synchronization signals from the television signal has important advantages when applicable. Code No. of Report: PB 105662.

D) NEW ELECTRONIC DEVICES COMPONENTS: High-Speed Cathode-Ray Tube: A cathode-ray tube has been developed to fulfill the need for simplifying the recording of transient waveforms that require spot velocities of 3,000 in/micro sec. and higher. Full information on the characteristics (operating voltages, interelectrode capacitances, etc.) is presented. Code No. of Report: PN 106746.

Dual Crystal Operation for Improved Frequency Stability with Varying Temperature. An investigation was made of the possibility of utilizing quartz-crystal oscillator plates having opposite temperature coefficients in such combinations as to provide effectively, a unit possessing low thermal drift characteristics of not more than 0.0001 percent over a temperature range of 10 degrees or 20 degrees C. Over the restricted temperature utilized for temperature-controlled applications, improvements in stability of from ten to twenty times can be obtained. Code No. of Report: PB 106655.

Signal Sampler and Synthesizer. A circuit has been developed for sampling the wave shape of a recurrent video signal, and synthesizing the samples into a similar wave shape having a low recurrence frequency. The method and techniques involved in this method of synthesis may have general applications to problems involving the direct relaying of "video" information over a narrow bandwidth. Code No. of Report: IB 105244.

W. L. Maxson Precision Phasemeter. Design and development of a precision phasemeter is described. The subject phasemeter will measure any phase angle with an accuracy of one-tenth of a degree between two sinusoidal voltages of from ½ to 10 volts over the frequency range of 20 to 20,000 cps. Code No. of Report: PB 105243.

Some Facts and Figures

Some idea of the extent to which industry is already making use of this service provided by OTS to help it achieve new developments is indicated by the number of reports sold and the sum industry pays for them.

Total sales run to an average of 2,000 copies of reports per month, resulting in monthly sales averaging $14,000.

Especially good sellers in the electronic field have been these reports:

PB 100949, ELECTRONIC MINIATURIZATION
PB 100950, PRINTED CIRCUITS
PB 101745. ELETRONIC EQUIPMENT CONSTRUCTION
PB 104386 SERVOMECHANISMS

The Closed Loop of Technical Progress in Electronics

In a nutshell, the Government agencies are spending heavily for technical developments in electronics, particularly to meet the needs of the Armed Services. Through the Office of Technical Services, those advances are funnelled to industry which applies them to produce better products, increase productivity, or create new products. The Armed Services in turn obtain better equipment and greater output to meet their electronic needs. It is this closed loop of technological growth that leads to ever greater industrial achievements and ever better military equipment as a result of the money spent for research.

The Office of Technical Services is extracting from the taxpayer's research dollar a dividend in the form of valuable ideas that save time and costs in developing new products, new processes. The opportunity is there, and it is an especially good opportunity for the electronic industries. The Department of Commerce welcomes you to utilize it and will cooperate to the fullest extent possible in helping you realize the benefits which this treasure-house of technical know-how affords.

- - - — - —

STATEMENT OF THE OWNERSHIP, MANAGEMENT, CIRCULATION, etc., required by the act of Congress of August 24, 1912, as amended by the acts of March 3, 1933, and July 2, 1946, of SIGNAL Magazine, published bi-monthly at Washington, D. C., October 1, 1952.

District of Columbia }
City of Washington } ss.

Before me, a notary public, in and for the state and County aforesaid, personally appeared George P. Dixon, who, having been duly sworn according to law, deposes and says that he is the Editor of the SIGNAL Magazine and that the following is, to the best of his knowledge and belief, a true statement of the ownership and management of the aforesaid publication for the date shown in the above caption, required by the act of August 24, 1912, as amended by the acts of March 3, 1933, and July 2, 1946, to wit:

1. That the names and addresses of the publisher, editor, managing editor, and business manager are:

Publisher: Armed Forces Communications Association, 1624 Eye St., N. W., Washington 6, D. C.

Editor: George P. Dixon, same address.

Managing Editor: Mary Marjorie Geoghegan, same address.

2. That the owner is: (if owned by a corporation, its name and address must be stated and also immediately thereunder the names and addresses of stockholders owning or holding 1 per cent or more of total amount of stock. If not owned by a corporation, the names and addresses of the individual owners must be given. If owned by a partnership or other unincorporated firm, its name and address, as well as that of each individual member, must be given.)

Armed Forces Communications Association, 1624 Eye Street, N. W., Washington 6, D. C.

3. That the known bondholders, mortgagees, and other security holders owning or holding 1 per cent or more of total amount of bonds, mortgages, or other securities are:

None.

4. That paragraphs 2 and 3 include, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting; also that the statements in the two paragraphs show the affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner.

GEORGE P. DIXON,
Editor.

Sworn to and subscribed before me this 7th day of October, 1952.

Seal MARINNA D. WAGGAMAN,
Notary Public.

(My commission expires 14 April 1957)

From Scientist to Soldier

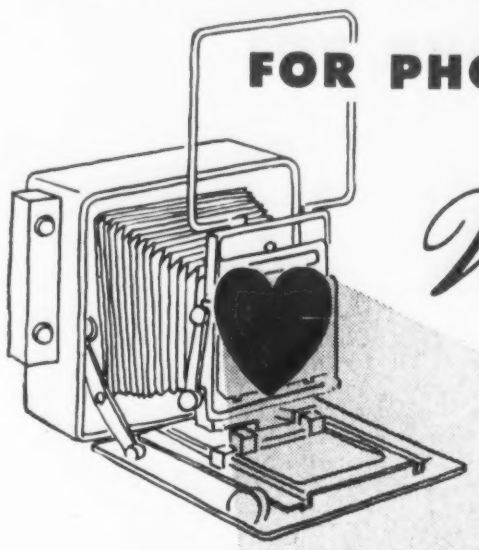
(*Continued from page* 20)

proven itself during the last year in Korea, is capable of transmitting a voice transmission simultaneously with radio teletypewriter operation. Although this radio set is normally transported by a 2½-ton cargo truck, it is sufficiently compact to be transported in a type C-82 aircraft. This set has a power output of 400 watts in the frequency spectrum of 2 - 18 mcs and has range of up to 1,000 miles.

Another recent addition to the Signal Corps list of new equipments is a Radiac Set (known as AN/PDR-27A). A Radiac meter which is the main unit of the set is capable of detecting the intensity (dosage rate) of both Beta and Gamma radiations. The radiac detector used with this set

(*Continued on page* 78 *col.* 2)

THE ONLY *sure* INSURANCE FOR PHOTOGRAPHERS . . .

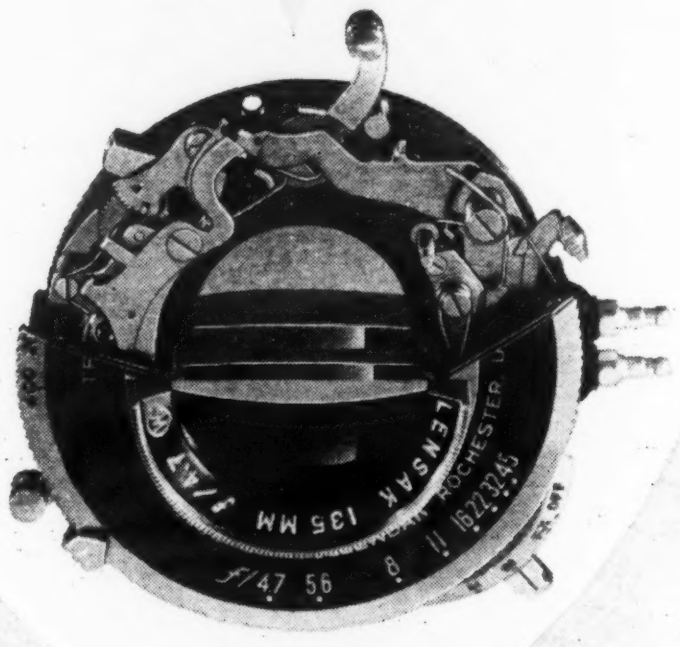


Wollensak RAPTAR LENS IN RAPAX SHUTTER

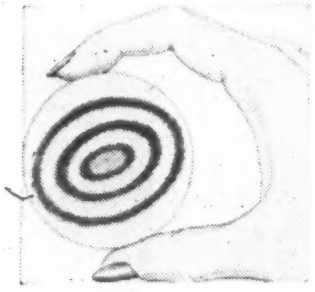
. . . the heart of every camera

RAPTAR LENSES are a series of f/4.5 lenses of 4-element construction. They are the highest quality and yield the finest definition without sacrifice of contrast. All air-to-air surfaces Wocoted.

RAPAX SHUTTERS are the first complete, fully synchromatic shutters. They are recognized the world over for dependability, shutter speed accuracy and consistency.



Your skill and artistic sense as a photographer cannot alone produce masterpiece prints. Much depends on your lens and shutter, the heart of any camera. A shutter must have accurate speed and consistency. It must be dependable, while a lens must deliver sharpness from corner to corner as well as in the center . . . high resolution without the sacrifice of contrast.



Every step in the manufacture of a fine lens is important. Take, for example, the elliptical shape of Newton rings (see illustration). This is caused only by pressure from two fingers. Similar pressure from poor mountings will distort the lens and destroy image quality. Raptar lens elements are mounted strain-free, to exacting requirements, and are controlled by very rigid standards and inspections. And mounting is just *one* step in lens manufacture. To safeguard your photographic skill be sure your camera is Wollensak equipped.

WRITE for new, informative "Selecting My Lens".

Raptar . . . the MASTERPIECE . . . of Lenses

Wollensak
OPTICAL COMPANY, ROCHESTER 21, N. Y.

DANDUX

specification designed

CANVAS

and leather

PRODUCTS

BG-44 Bag

TOOL ROLLS—BAGS & CASES
BG BAGS—CW BAGS
RADIO EQUIPMENT
ELECTRONIC EQUIPMENT
RADAR EQUIPMENT

C. R. DANIELS, INC.

DANIELS, MD.

75 West St., New York 6, N. Y.

549 W. Randolph St., Chicago 6, Ill.

From Scientist to Soldier

(Continued from page 77)

is a probe attached externally by means of a self-retracting cable, to the radiac meter. The complete radiac set may be carried by handle or by an externally connected shoulder harness. This equipment may be used to check equipment for radioactive contamination, locate lost radioactive material, and to monitor areas in the field to determine the extent of radiological health hazard in those areas. (See Figure 3)

Still another new type equipment currently being issued to field units is the Rawin Set (AN/GMD-1). This new meterological set, possessing technical characteristics vastly superior in accuracy, range, and elevation angle sweep to its predecessor (Radio Set, SCR-658) will permit obtaining accurate wind data to elevation angles as low as six degrees and to ranges of 125 miles. This permits obtaining accurate data to altitudes of 100,000 feet.

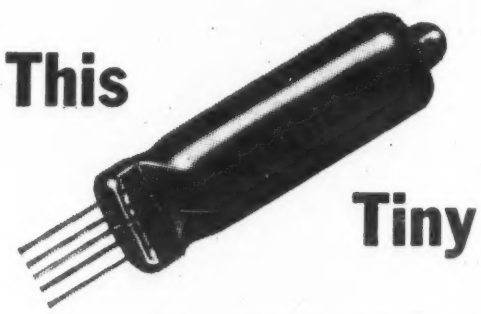
In the field of photography a Mobile Laboratory Darkroom, known as the AN/TFQ-7, has been developed and is currently being issued to selected Division Signal Companies. This darkroom is a complete unit containing the necessary facilities of processing 35mm, 70mm and up to 9½" widths of roll film, 4" x 5" black and white, color film and film packs, contact prints and sizes up to 10" x 10" and projection prints up to 11" x 14". Mounted on 2½-ton truck, it is designed for field use under any climatic conditions from —65°F to 125°F, and under any degree of humidity. A water supply system of the mobile laboratory darkroom consists of a 50 gallon water storage tank and the necessary tubing and pumps to circulate the water. Fresh water may be pumped into the laboratory through a 50 foot length hose from a suitable stream or any other source of water. When a water source is lacking water previously stored within the water system of the laboratory, and contaminated in use with by-products of processing, procedures may be recirculated through the ion-exchange unit or decontamination to the water storage system.

The supervision and operational control of the Signal Corps New Equipment Introductory Teams as well as research and development of Signal Corps equipments, has been vested in the Commanding General, Signal Corps Engineering Laboratories, Fort Monmouth, N. J.

RAYTHEON

Excellence in Electronics

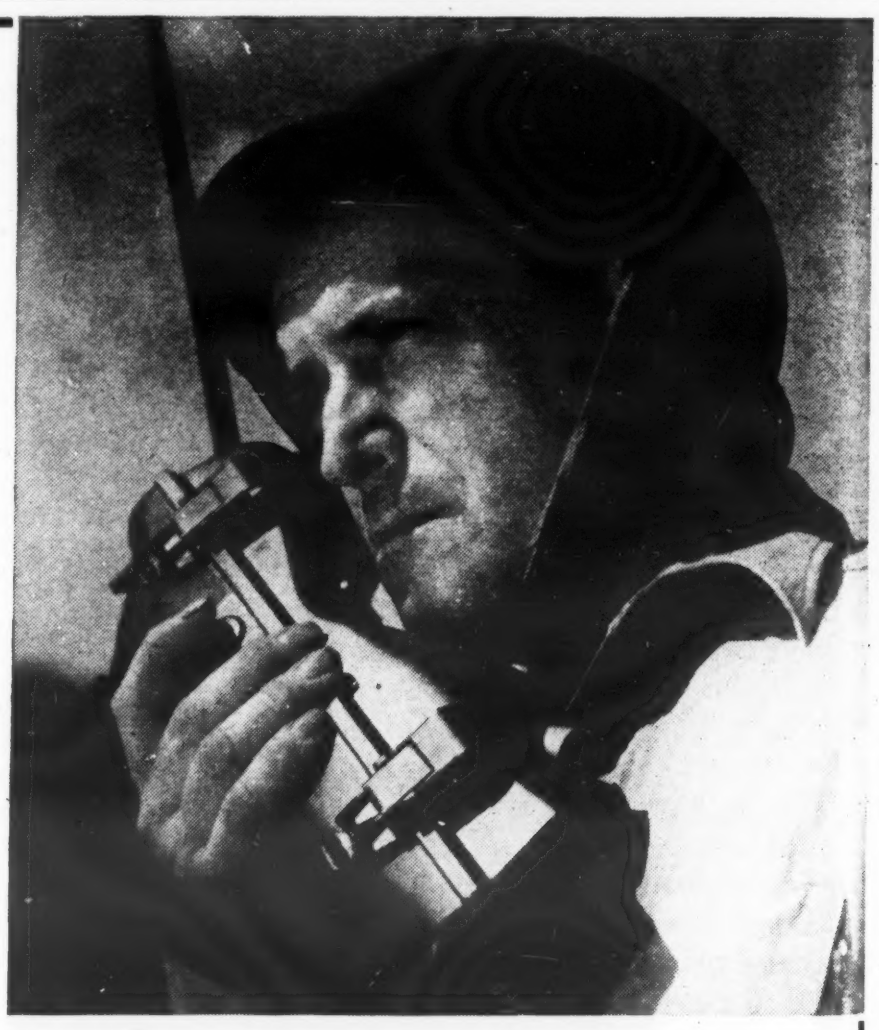
From This



Tiny Tube . . .

A HARVEST OF HAND RADIOTELEPHONES

The subminiature tube, a Raytheon development, made possible this lighter, more compact hand transmitter-receiver AN/PRC-6. Raytheon developed and is mass-producing this equipment . . . another Raytheon contribution to improve the effectiveness of our Armed Forces.



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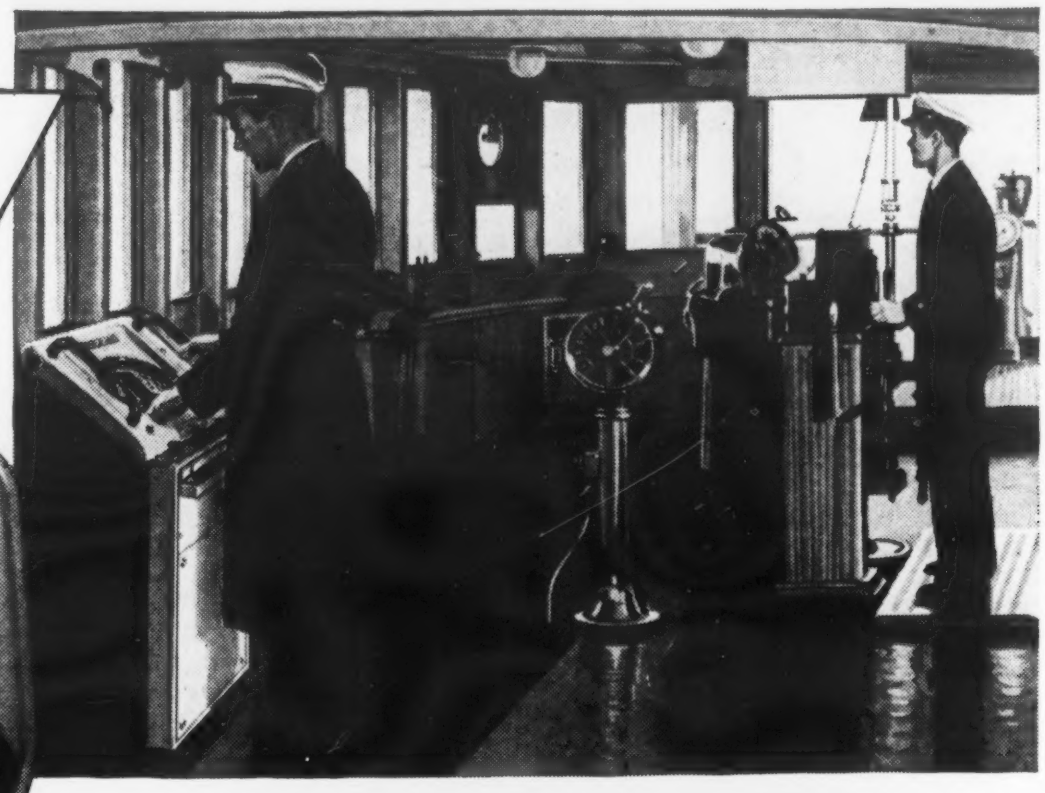

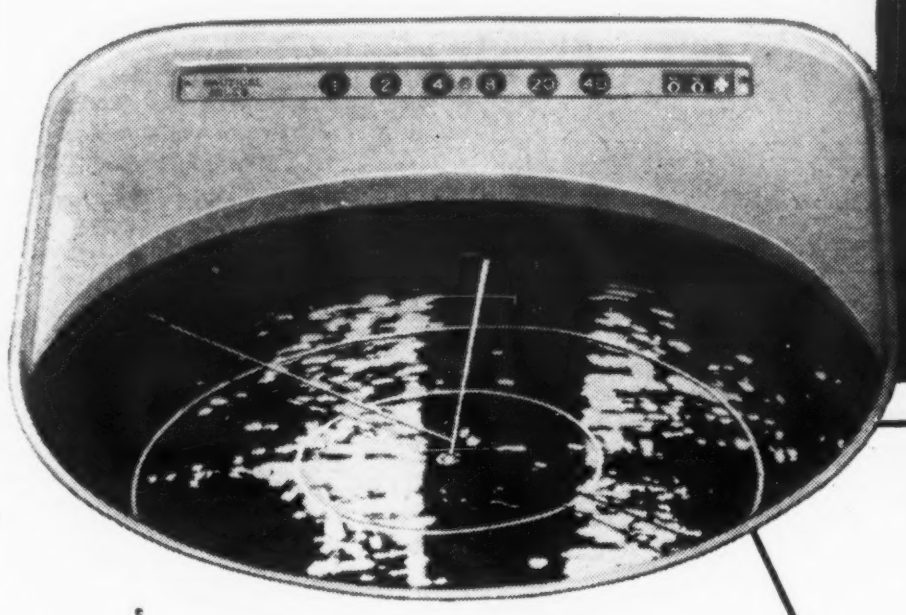

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Money Talks

(*Continued from page 26*)

in charge of the entire military procurement program. His authority would supersede that of the established military hierarchy.

2) Responsibility for implementing this procurement program would be placed in the hands of competent civil service employees trained for their assignments. This would obviate the necessity of using the services of military officers who are assigned on a temporary basis and transferred periodically. It would further release military personnel for purely military assignments.

3) Regulations and procedures emanating through the Secretary of Defense would be disseminated to all procurement officials and would be uniformly interpreted. Under present procedures, there are many instances where each Technical Service or Department develops a separate interpretation of a regulation.

4) It would make possible consolidation of functions which are presently duplicated. For example, procurement agencies have an Industrial Service Division, Small Business Division, Security Office, Contract Preparation Group, and Specification and Reproduction Center. These functions are identical in all Agencies, and can be consolidated. In some instances, Agencies are competing with one another. The Navy, Air Force and Army Industrial Service Divisions presently make separate facility surveys. This can be prevented by consolidation.

5) Consolidated bid lists can be posted at different locations for interested bidders, instead of lists pertaining to purchases of each Technical Service. Today a contractor must either subscribe to a commercial journal, pick up a Department of Commerce synopsis or arrange for a representative to personally visit an Agency in order to be informed of pending bids. It is an expensive operation and a duplication of effort to visit several Agencies simply to check bid availability. Although some Agencies have field offices to disseminate information, this is not wholly satisfactory. The field offices do not always have complete specifications, bid forms, or more specifically lack technical personnel to discuss the job. Such personnel are generally only available at the Engineering Laboratory or Buying Office.

6) Security procedures would be standardized. At the present time, Central Intelligence Agency is supposed to handle overall security problems. The situation still prevails that a contractor will be cleared by one service and not by another.

7. Serious inspection bottlenecks would be broken. It has been consistently difficult for the contractor to obtain service of inspection personnel when material is ready for shipment. In many instances, companies have had to wait several weeks, after equipment has been produced, before inspectors visit their plant. This retards the defense effort and delays payment to the contractor. It also increases the Government's cost of equipment. Consolidation would materially improve the present setup. This becomes even more apparent when it is realized that in many areas an Army, Navy or Air Force inspector *will call simultaneously to conduct an inspection at the same plant.*

8) At times Services are at odds with other Services, in their efforts to obtain procurement responsibility for items which they feel belong in their jurisdiction. This produces unnecessary dissension and interferes with efficient performance. Unification of procurement would eliminate this type of service squabble. Employment of personnel who perform identical functions in each agency. i.e. hundreds of receptionists, messengers, clerks, etc. would be eliminated thereby resulting in savings of millions of dollars to the taxpayer.

9) Considerable savings would be affected in overhead expense items. For instance, at the present time many agencies use different contract forms to make purchases. Such duplication would be eliminated. Printing and contract preparation functions would be combined. Reproduction equipment, IBM machines etc. can be pooled under an integrated procurement organization. In the event of another conflict, this country must use all of its available resources. We cannot afford to overlook the need for efficient administrative planning, particularly with respect to our procurement program. An effective procurement organization means the difference between victory and defeat. Politics must not be permitted to stand in the way of a sweeping reorganization of the present military procurement setup. This plan is only a step in that direction!

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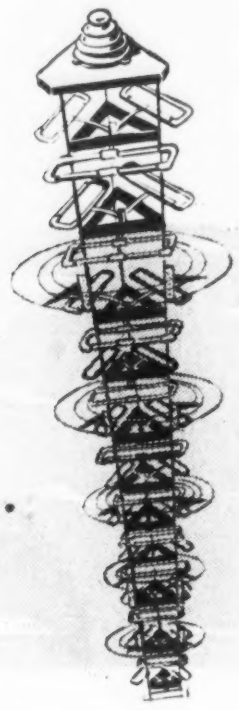

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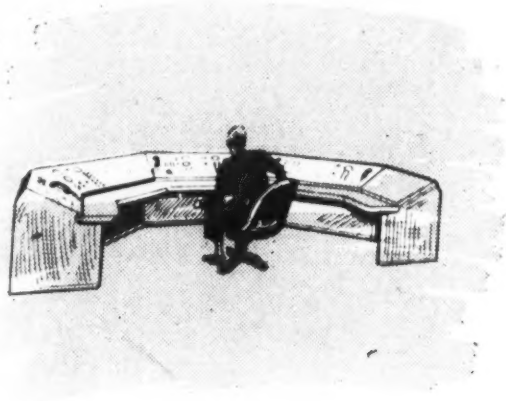

Studio equipment, control consoles, monitors.

WITHIN THE NEXT DECADE television will grow beyond all present-day conceptions. International Telephone and Telegraph Corporation is ready to help speed the new industry on its way—ready with new transmitters of advanced design, improved studio equipment, high-gain antennas, microwave links for studio-to-transmitter and mobile pick-up—and ready with the finest instrument for home entertainment, the incomparable Capehart. Look to IT&T, together with its associate companies, for tireless effort in television development.

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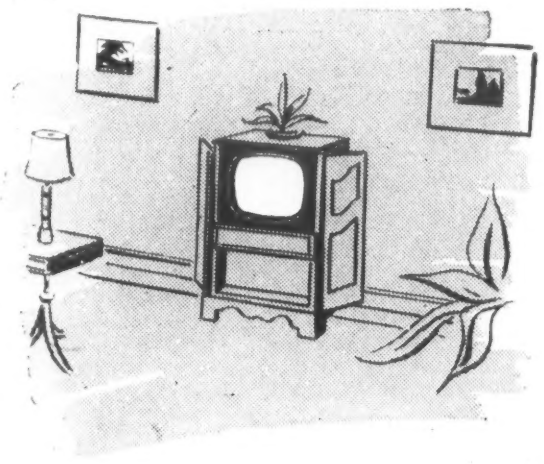

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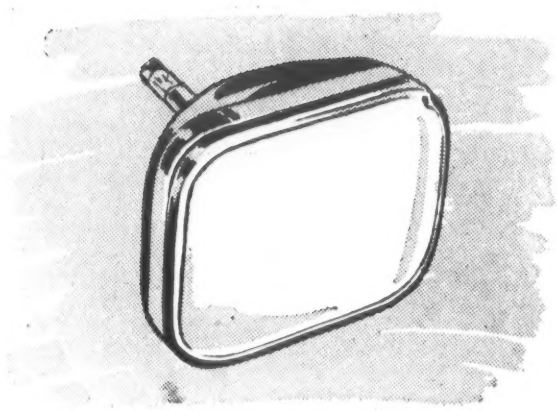

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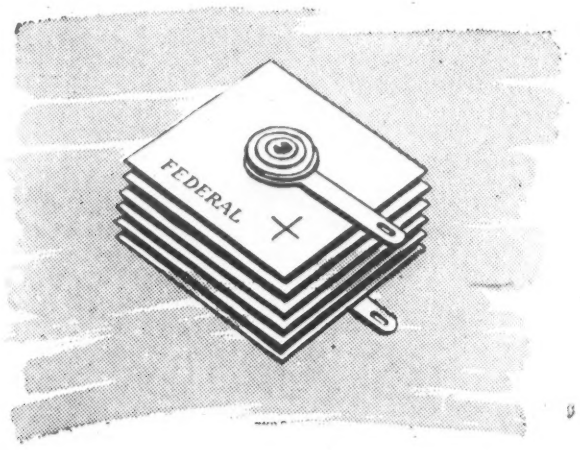

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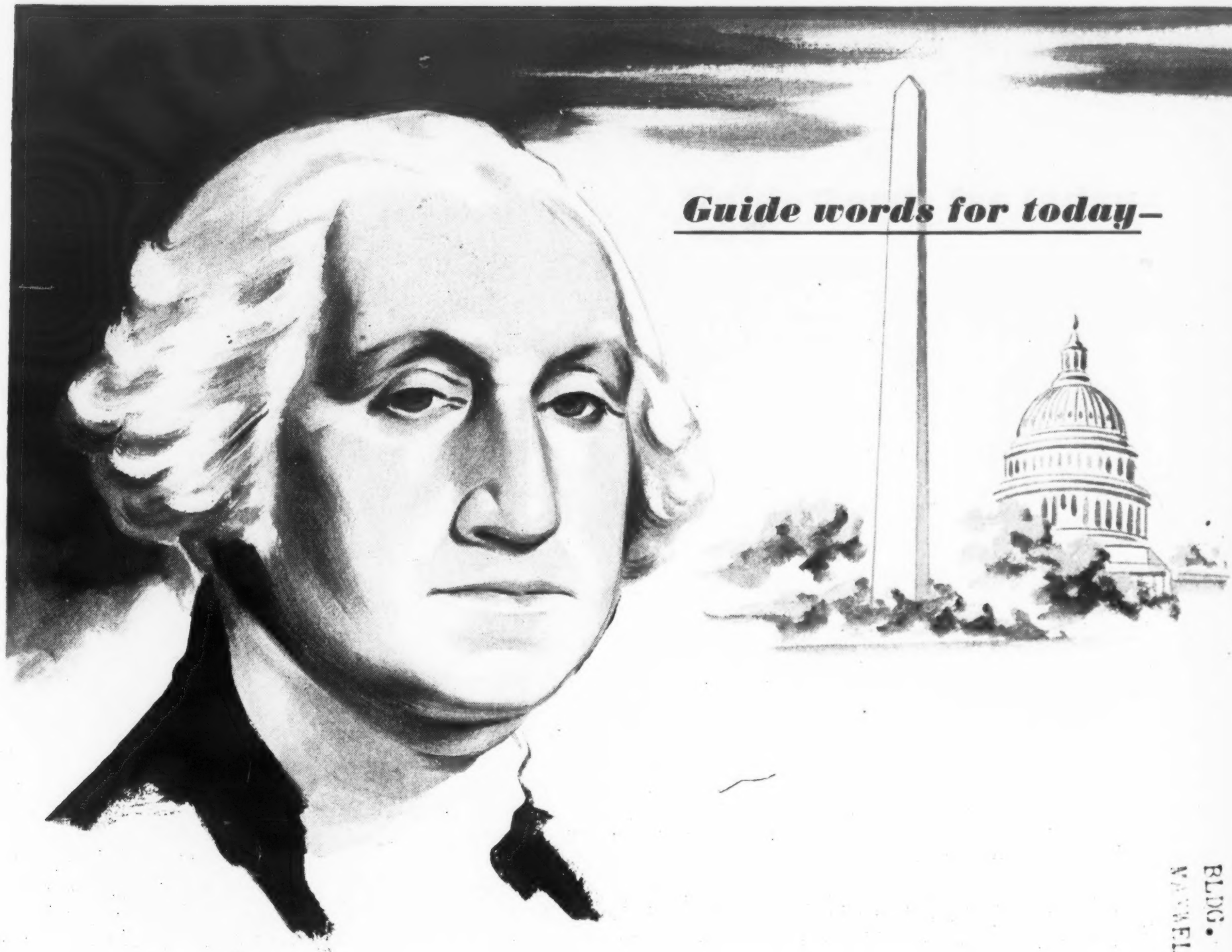

"Our country's honor calls upon us for a vigorous and manly exertion; and if we now shamefully fail, we shall become infamous to the whole world."

—GEORGE WASHINGTON

The selection of a new President is a time for new hope and renewed determination. The President-elect carries with him the high hopes of Americans for a new era of peace and prosperity under great leadership.

The problems are difficult, the decisions grave, the crises urgent. "Blood, sweat, toil and tears" are as necessary now in the cause of peace as they were in the cause of war. But with faith, freedom and "manly exertion" on the part of all citizens, the nation can again move forward to her great destiny, and help achieve the lasting peace to which all the world's people aspire.

W B Stuart

President

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